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PAXTON'S

MAGAZINE OF BOTANY,

AND

REGISTER OF FLOWERING PLANTS.

"Flowers of all hue."

SMITHSONIAN INSTITUTION
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SPECIAL COLLECTIONS

VOLUME THE SIXTEENTH.

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TO

THE GARDENING WORLD IN GENERAL;

BUT

MORE ESPECIALLY TO THOSE CONTRIBUTORS

TO

THE MAGAZINE OF BOTANY,

WHO HAVE KINDLY ENRICHED ITS PAGES BY THE EXPERIENCE EXEMPLIFIED
IN THEIR COMMUNICATIONS,

This Volume

IS SINCERELY AND WITH MUCH PLEASURE DEDICATED

BY

THEIR FAITHFUL AND OBEDIENT SERVANT,

JOSEPH PAXTON.

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PAXTON'S
MAGAZINE OF GARDENING AND BOTANY.

INTRODUCTORY ADDRESS.

ON the 1st of January, 1849, we issued the concluding Number of our Magazine of Botany, the work being now completed in fifteen volumes, portions of which have regularly appeared in monthly parts during the last fifteen years. The original design of the Editor has been fulfilled, and the success of his labours has far exceeded the highest expectations he had entertained.

During the lengthened period which has elapsed since that work commenced, how many are the occurrences which have taken place—how numerous the changes which might be noticed—how many of its earliest supporters have disappeared from this scene of action, and are succeeded by others, equally, if not more interested in the subjects on which we have treated;—how wonderfully every department of knowledge has advanced; and what a vast difference there is in general cultivation compared with that of fifteen years ago:—the principles by which the various gardening operations are now conducted, were then very little understood, although the manner of performing them had been handed down from father to son for successive generations.

Garden structures for plants and fruits are also very different to what they then were; the system of heating and ventilation has received a large share of attention; and, being conducted on scientific principles, the atmosphere of our glass-houses, which were formerly unhealthy, and often pestiferous, have now, generally speaking, become sweet and wholesome; while bottom heat by fermenting materials, has yielded to hot-water tanks.

Botany and other sciences have also advanced in an equal ratio; field after field has been traversed by Botanical collectors. Desert wilds, exposed to the burning rays of a tropical sun, or dense woods where those rays have never penetrated, and which were perhaps never before, since their creation, impressed with a human foot,—have been explored, and their magnificent or curious products brought to light. The means by which this vast change has been effected, must be mainly attributed to a most liberal support on the part of the public, and the united energies both of scientific and practical men. Horticultural and other societies have encouraged and stimulated to exertion; and publications teeming with botanical and horticultural intelligence have diffused the acquired knowledge; and thus we have been brought, step by step, to the present bright and eventful period in the history of Gardening and Botany.

Amongst the many periodicals which have rendered assistance in this vast renovation, the Magazine of Botany has held a very prominent position; its extensive sale has spoken in audible language, and told of the high estimation in which it has been held by the public. It has proved that both the form in which the work appeared, and the manner in which it was conducted, gave entire satisfaction.

The unvarying encouragement received, always stimulated to renewed action: we formed for ourselves a very high standard: at this we constantly aimed, and in whatever we fell short, it was neither through negligence or want of effort.

The present state of society, however, requires us, in commencing our labours for 1849, to enter upon a far more extensive field of action. Floricultural subjects, however lovely or enchanting, are not the only ones which must henceforth occupy the attention of those, who would keep pace with the progress of gardening pursuits; for, although an almost undivided attention has been paid by many practical men, for years past, to ornamental plants, it has only been with the design of placing Botany and Floriculture in the same position as that occupied by the other, and perhaps more useful, portion of the vegetable creation. This end being attained, we feel that we can now usefully direct our attention to vegetable nature in all its vast variety, and cultivation in all its different forms, both of fruits, vegetables, and flowers. We propose, therefore, calling the new work the Magazine of Gardening and Botany; and to carry out our views properly, it is necessary to bring together the opinions and practices of all classes of scientific and practical men—especially Horticulturists and Floriculturists, placed, as they must be, under so many different circumstances, operating in various parts of this and other countries—affected by different climates—in some cases labouring under a multitude of disadvantages—in others, possessing every facility for carrying out their views to the utmost of their wishes.

To accomplish all this, and render the Magazine of Gardening and Botany everything that could be desired, we have thrown open its pages to domestic and foreign correspondence, and have secured the services and co-operation of some of the most eminent men in their profession; besides this, we look to our friends and the public from time to time to favour us with everything new and interesting which the design of this Magazine embraces.

Each number, which will appear monthly as heretofore, will contain two highly-finished plates, having two, three, or more subjects coloured after Nature—such only being selected as are of importance to cultivators, and these will not, as in the "Magazine of Botany," be confined entirely to flowers, but will embrace fruits, or such other subjects as are of importance to the science. Wood-cut illustrations, of an artistic character, consisting of plans of flower gardens, elevations of Garden Structures, Instruments and Utensils necessary for the operator, Insects injurious to cultivators, and other subjects connected with the design of the Magazine, will also be liberally interspersed throughout the matter.

The letter-press will consist of thirty-two pages royal octavo, closely printed, including articles from the first pens on Botany, Floriculture, Horticulture, Arboriculture, Landscape Gardening, Natural Science, Rural Affairs, and every other subject connected directly or indirectly with the vegetable creation.

By our present large circle of subscribers who have travelled with us from the commencement, the change we are satisfied will be hailed with pleasure, as since the termination of the "Gardener's Magazine," on the death of Mr. Loudon, no popular vehicle of the kind, embracing every department of gardening, has been issued from the press. The advantages also derived from our present arrangements are great and important in other respects. The annual number of carefully selected

DSI

coloured subjects will be nearly equal to former years; the wood-cuts will be more numerous; the matter will be greater in quantity, and of first-rate quality; and lastly, the subjects written upon will be various, embracing everything truly interesting in the vegetable world.

To NEW SUBSCRIBERS we present a work which, in its illustrations, cannot be surpassed; and as its matter will emanate from the pens of some of the most eminent men in their profession, the directions given may with confidence be received and adopted.

To AMATEURS we present a handsome drawing-room book, and a pleasant companion for their leisure hours, treating in a popular form on every branch of gardening, and not only recording improvements, but giving practical directions, which long experience has proved to be safe and economical.

To GARDENERS we offer a Magazine in which all their discoveries and improvements can be recorded and made known, and likewise where may be found everything which in this advancing age it is desirable or important for them to become acquainted with, especially as through this medium they will be able in every part of the country, to see faithfully-coloured figures of new plants, almost as soon as they are brought under the notice, of their more fortunate brethren in the neighbourhood of the metropolis.

To YOUNG GARDENERS this Magazine will be of the greatest importance, as in it they will find recorded the different views of persons who stand high in their profession, and whose experience cannot fail to be highly beneficial to them; the various faithful illustrations also will assist them in the practice of drawing, and give ideas of artistic skill, in the pursuits for which they are in course of training.

To NURSERYMEN we open a medium not easily equalled for making known their most valuable productions, especially as our Magazine will circulate extensively amongst the nobility and gentry, who purchase plants of the highest class.

To FLORISTS we have to say,—that our work will contain articles on Florists' flowers, written by the first cultivators in the kingdom. We also intend further to meet their wishes by giving in each volume additional plates of some of their first-rate prize flowers.

To THE PUBLIC we have only to add, that from the facilities we possess, and our determination that no expense or exertion shall be spared to render the MAGAZINE OF GARDENING AND BOTANY a work of first-rate excellence, they may, without fear of disappointment, depend upon its contents as a general guide in all their gardening operations, and as a record of everything that is new or beautiful in Nature.

CHATSWORTH, *January* 12, 1849.

DIPLADENIA NOBILIS. (Noble Dipladene.)

Class, PENTANDRIA.——*Order,* MONOGYNIA.——*Nat. Order,* APOCYNACEÆ.——(Dogbanes, *Veg. King.*)

GENERIC CHARACTER.—*Calyx* five-cleft, with one or two little glands on the interior on each side at the base of the segments; glands sometimes ligulate, sometimes scaly. *Corolla* salver-shaped, or with the tube cylindrical at the base, and funnel-shaped above, hispid about the origin of the stamens, throat ex-appendiculate; lobes twisted to the left in æstivation. *Anthers* nearly sessile, inserted in the upper part of the tube, at the middle or below the middle, where the tube widens, sagittate, adhering to the middle of the stigma, acuminate at the apex, or ending in an acute membrane. *Glands of the nectary* two, alternating with the ovaries, obtuse, single by reason of two being for the most part joined evenly together. *Ovaries* two, sometimes longer than the nectary. *Style* one. *Stigma* globular, surrounded beneath with a reflexed, umbrella-shaped membrane. *Follicles* and *seeds* as in *Echites.*

SPECIFIC CHARACTER.—*Corm* roundish, tuberous. *Stem* and every part quite smooth. *Leaves* on very short stalks, oblong, acute, rounded at the base, with numerous prominent curved veins. *Flowers* in terminal one-sided racemes, large, distinct, smooth. *Sepals* very narrow and acute, much shorter than the pedicel. *Corolla* between tubular and campanulate, very narrow at the base (two inches long), with roundish-ovate (or acuminate) lobes (white on the border, pink in the tube and throat, greenish at the base).—*Lindley.*

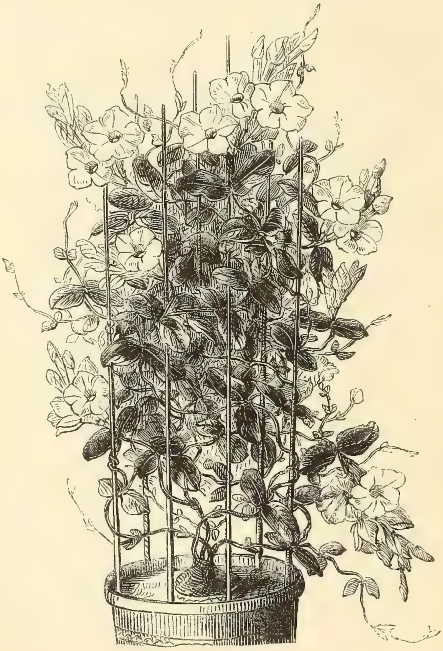
1. *Rose-coloured variety.*—*Flowers* uniformly pink, with a large finely-expanded limb; *lobes* of the corolla acuminated; orifice of the tube wide, base very contracted.

2. *Pale variety.*—Expanded limb of the flowers nearly white; lobes roundish-ovate, orifice of the tube more contracted than in the dark variety, of a deep crimson purple, as is also the greater part of the tube; base less contracted than in the dark variety, and of a waxy yellowish appearance.

AUTHORITIES AND SYNONYMES.—Dipladenia nobilis, *Morren* in *Annales de la Soc. de Gand,* iii. 152; *Lindley* in *Gard. Chron.,* 1847, 748. Echites nobilis *of the Nurseries.*

THIS fine species of Dipladenia is a native of Brazil, and was named by Professor Morren, who informs us that the corms were sent from St. Catherine's to M. Verschaffelt, who obtained a first prize for it at the Exhibition at Ghent, in June, 1847.

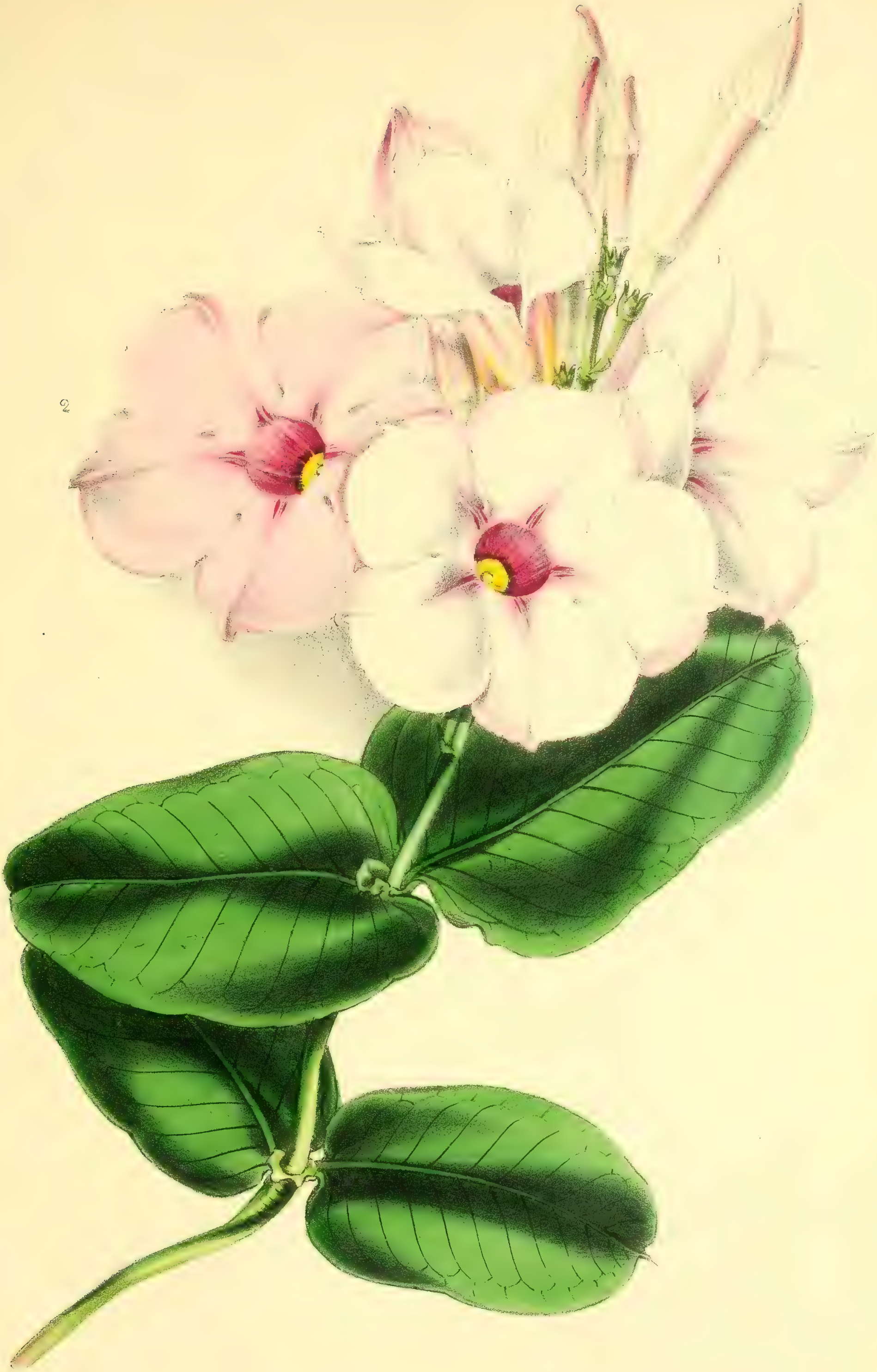
The Professor notices two varieties, with flowers very dissimilar in appearance, although perhaps neither of them scarcely equal to those of *D. splendens* and *crassinoda;* they are, however, first-rate additions to this very beautiful genus. Both of these varieties we have figured in the accompanying plate.



Our drawing of the dark variety was made in the Nursery of Mr. Glendinning, Turnham Green, in whose stove it bloomed during the month of October, 1847. The plant was received, about two years ago, by that gentleman from M. Miellez, of Lille, without any particulars respecting its history, except that it was first imported about three years since into Belgium, from South America, by one of the Belgian collectors. Mr. Glendinning is of opinion that the two varieties are not really distinct, or the colours permanent, but that they become dark or light, according to the local circumstances in which they are placed, a change not uncommon in the members of this genus.

Our figure of the pale kind was made at Messrs. Rollisson's, Tooting, during the same month mentioned above. In both places the plants, when in bloom, were fine objects.

The species is a stove climber, and both of its varieties thrive well in a mixture of equal parts light rich loam, heath mould, and very coarse sand. When in bloom, it is



S.Holden del. & Lith.

Dipladenia nobilis.

necessary to give full exposure to the rays of the sun, otherwise the flowers will neither expand in such profusion nor will the colours be nearly so brilliant; and no damage can be sustained by such exposure, if a sufficiency of moisture be supplied to the roots, as the large fleshy corms will enable the plant to bear almost any amount of solar heat without injury.

During the season of growth and flowering, expose to a humid atmosphere, and give a free supply of water at the roots; occasionally a little much-diluted liquid manure might be administered with good effect, but great care is requisite that this be neither too rich nor given in too great a quantity, otherwise the fleshy corms are liable to be injured. As the growth diminishes, gradually lessen the quantity of moisture, and in winter keep the plants rather dry, and in an airy situation.

It may possibly be advantageous to prune the plants a little during the season of rest, and stopping during the early part of the season of growth would make them more bushy.

M. Alphonse De Candolle, in his "Monograph of Apocynaceæ," has separated this genus from the old Linnæan genus *Echites*, giving it the name of Dipladenia, from *diploos* double, aud *aden* a gland, in allusion to the two tubercles which are found at the base of the ovary. The genus as at present constituted contains about twenty species, all deserving cultivation, and several of which have been introduced to this country through Messrs. Veitch and Son, Exeter.

Propagation is effected by cuttings of the half-ripened wood, planted in sand in the usual way, and placed in the propagating house or other situation where they can receive a brisk moist heat.

BROWALLIA JAMESONII. (Mr. Jameson's Browallia.)

Class, DIDYNAMIA.——*Order*, ANGIOSPERMIA.——*Nat. Order*, SCROPHULARIACEÆ.——(Fig-Worts, *Veg. King.*)

GENERIC CHARACTER.—*Calyx* membranous, tubular, ten-ribbed, five-toothed. *Corolla* salver-shaped, resupinate from the contortion of the peduncle; tube fifteen-nerved, ventricose at top; limb oblique, five-lobed. *Stamens* four, didynamous, without any rudiment of a fifth. *Anthers* of the upper filaments reniform; of the lower ones parallel with the filaments, having the upper cell the smallest, and sometimes abortive. *Ovary* surrounded at the base by a large, cup-shaped, fleshy disk. *Stigma* two-lobed, four-tubercled, with two excavations on the back for the reception of the upper anthers. *Capsule* oblong, two-celled, two-valved, many-seeded. *Dissepiment* contrary. *Placentas* two, fleshy. *Seeds* angular.

SPECIFIC CHARACTER.—*Plant* a shrub. *Leaves* alternate, neat, about the size of those of a broad-leaved Myrtle, to which they bear a considerable resemblance. *Racemes* axillary and terminal, containing from three to five flowers. *Calyx* teeth acute. *Corolla* of a rich orange; limb five-lobed, oblique, spreading; lobes roundish, ovate. *Disk* conspicuous.

AUTHORITIES AND SYNONYMES.—Browallia, *Lin.* Browallia Jamesonii, *Bentham.*

THIS species of Browallia is the most beautiful and remarkable of the whole genus; and especially when it is studded with a profusion of bright orange blossoms, in which state it appears throughout most of the summer and autumn. It differs also from all the kinds hitherto introduced in being a neat evergreen shrub, with a habit not much unlike that of a myrtle; whereas of the seven or eight kinds previously known in our collections all were annuals: of these the *speciosa* bears much larger flowers than our present subject, but being annual is far less valuable.

For the opportunity of figuring this very interesting plant we are indebted to Messrs. Veitch and Son, by whom it was lately introduced, and in whose nursery it was blooming profusely in June, 1848. It is a native of the north of Peru, and was found by their collector, Mr. William Lobb, growing at an elevation of 6000 feet, in woods near Molitre, in the province of Cuenca, which lies inland from the Gulf of Guayaquil; he describes it as a shrubby plant two or three feet in height.

The cultivation of all the annual species is so well known, that no more need be said than that the seeds should be sown in pots, and placed in a hotbed like other tender annuals; after being transplanted into pots of light rich soil, and grown to a sufficient size in heat, they should be removed to the greenhouse to flower, and where, during the summer, they will make a very good show.

Our present subject is a hardy greenhouse plant of easy culture, and should be potted in a mixture of equal parts light sandy loam, leaf mould, and peat, with good drainage. Several plants in the Nursery of Messrs. Veitch, were standing in the open air in autumn, and bore a slight frost uninjured; from which circumstance those gentlemen conclude that the plant might be kept through the winter in a cold pit.

Propagation is effected by cuttings of the half-ripened wood, planted in pots of sand, and placed in the propagating house or in a hotbed.

The generic name was given by Linnæus in honour of John Browallius, Bishop of Aboa.

NEMOPHILA MACULATA. (Spotted-flowered Nemophila.)

Class, PENTANDRIA.——*Order,* MONOGYNIA.——*Nat. Order,* HYDROPHYLLACEÆ.——(Hydrophyls, *Veg. King.*)

GENERIC CHARACTER.—*Calyx* hairy, persistent, ten-cleft, five divisions ovate, nearly erect; the remainder smaller, lanceolate, alternate, and reflexed. *Corolla* funnel-shaped, of five equal emarginate lobes. *Ovary* one-celled, many-seeded.

SPECIFIC CHARACTER.—*Plant* an annual, covered with stiff hairs. *Radical leaves* pinnatifid, lyrate; divisions short, obtuse, somewhat sickle-shaped, entire; *upper leaves* wedge-shaped, trilobate. *Peduncles* axillary, one-flowered, much longer than the leaves. *Calyx* erect, segments ovate-lanceolate; reflexed ones linear-lanceolate, acute. *Corolla* much larger than the calyx, lobes broadly-ovate, obtuse, white, with a deep violet-blue blotch on the tip of each. *Ovules* numerous.

AUTHORITIES AND SYNONYMES.—Nemophila, *Nuttall, D. Don.* Phacelia, *Juss., Pursh.* Nemophila maculata, *Bentham,* in *Jour. Hort. Soc.* iii., p. 319.

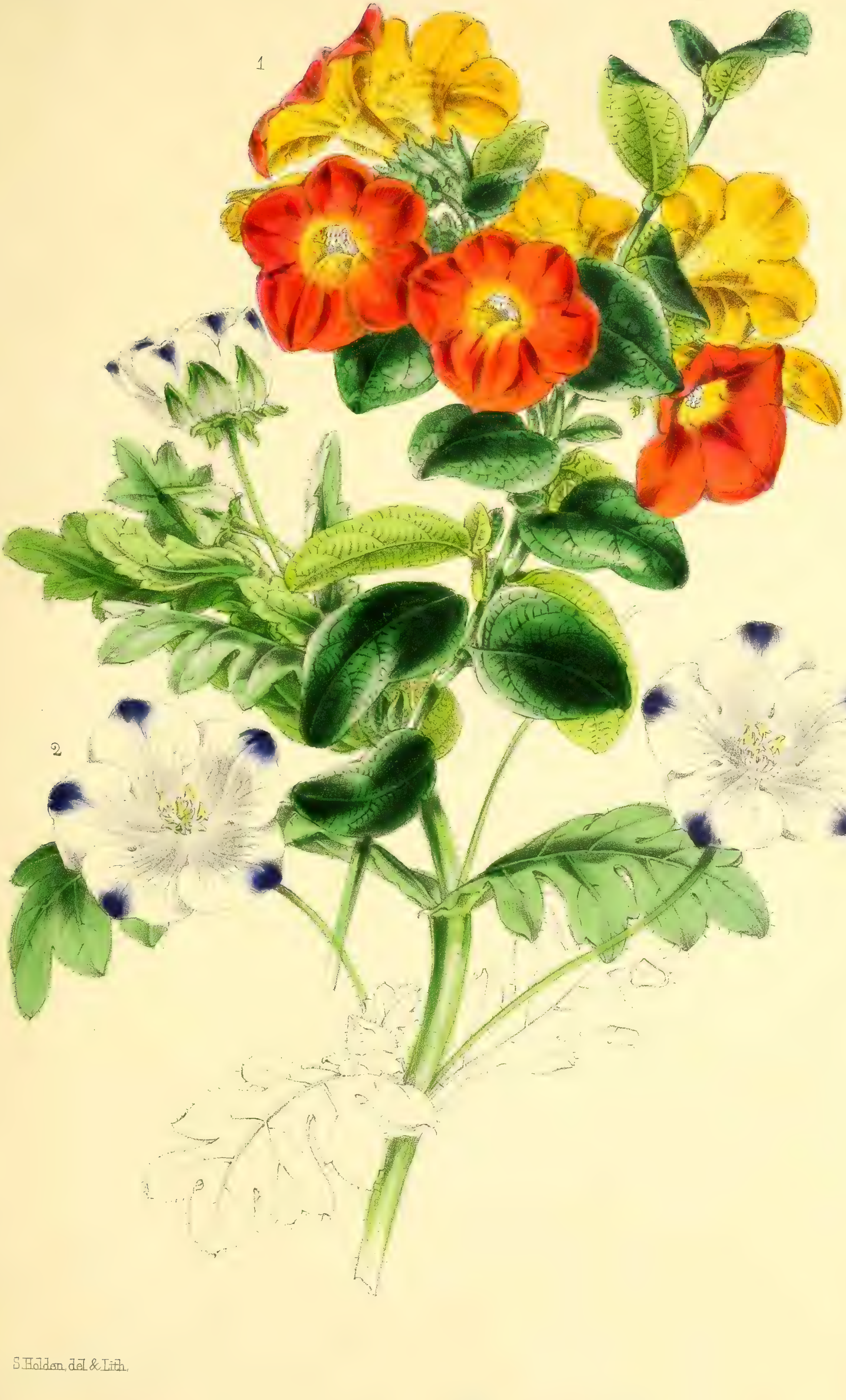
THIS is said by Dr. Lindley, to be the best annual yet raised from the seeds collected in California by Mr. Hartweg. The habit of the plant is that of *N. insignis.* The flowers are large and showy, being rendered particularly lively by the deep blue blotches on the tips of the segments of the corolla. The colours, however, are less permanent than could be wished; sometimes the dots are small, faint, ill defined, or run; and at other times the white becomes tinged with blue; altogether, however, it is a very good plant.

It requires the same treatment as *N. insignis,* that is, if the plants are wanted to flower very early, raise them on a hotbed; but if otherwise, they may be sown in the open garden as early as the season will permit, on a warm south border, observing to transplant when the weather is fine, and the plants pretty strong; a good bloom may be expected, which will continue the greater part of the season. A second sowing may be made a month or six weeks later, but it is necessary to allow these plants to flower where they were sown.

All Nemophilas delight in situations rather moist and shady, and spread themselves out the best when planted in a bed of peat or very rotten vegetable mould. It is from their love of shade that the generic name was given, from *nemos,* a grove, and *phileo,* to love.

The seeds should be collected from plants, which produce perfect flowers, otherwise their beauties will soon deteriorate.

Our drawing was made in the Garden of the Horticultural Society, Turnham Green, in September, 1848.



S. Holden, del. & Lith.

1. Browallia Jamesonii.
2. Nemophila maculata.

FLORICULTURE.

By Mr. Dixon, Florist, Brixton Hill.

It is with mingled gratification and pride, I appear before the readers of the Magazine of Gardening and Botany as the advocate of Floriculture. So much has been said and written on the subject, that it would almost appear superfluous to attempt giving another version of the laws and regulations by which the World of Flowers is regulated; but, on minutely investigating the different systems proposed, I find such ample room for improvement, as induces me to lay before the patrons of this work, my own peculiar views on the matter. More than thirty years of my life have been devoted to this pursuit—not to the theory alone, but to the practice. Experience, acquired during so many years, enables me to assert, without any fear of contradiction, that Flora exacts from her admirers something more than mere passive obedience to her laws. They will, it is true, prevent any violent outrage on Nature; but their workings, duly considered in connexion with particular objects, are capable of being rendered doubly useful. Entertaining these ideas, I have given every spare moment to the consideration of how I might best simplify a code of laws for the subjects of Flora, as would render the government of her kingdom a matter of little difficulty. To this end I have studied the nature of plants, their health and habits, under different courses of treatment; and having, by practical experience, reduced the gigantic notions of theory to its proper limits, proceeded to condense the information obtained, so as to render it acceptable to those parties for whose practice it was intended. This purpose has been to me one of the deepest interest, and to its advancement I have devoted unreservedly my most zealous exertions, which, I am proud to say, have not been unavailing, as the number of proselytes gained to my opinions sufficiently testify.

Steering a middle course between those who write on Floriculture—a mere idle amusement, a pleasure, or toy, unconnected with scientific acquirements of any kind, and those who reduce its operations to little less than drudgery—I will endeavour, by explaining causes that produce such extraordinary effects, to add interest to the experiments, by enabling my readers to predict results. Improvement in Floriculture has been gradual, and is still progressive. Fifty years since, growing two or three pet flowers was the favourite pastime of a few humble and somewhat illiterate individuals. The cultivation of extensive collections —the produce of every part of the known world, is now the scientific recreation of the learned, the refined, and the noble. All that intellect can boast, all that wealth can purchase, or the heaven-gifted mind of man conceive, has been, and is, devoted to the possession and realisation of floral beauty. It might afford amusement—perchance, instruction—were I to trace the improvements I quote, step by step; but, presuming that my general readers would prefer perspective advantages to retrospective discussions, I shall, for the present, leave the subject, and recur to it again when time is less an object to the florist than at the commencement of a season.

It is sufficient for my present purpose to assert that, generally speaking, the power of creating variety in form and colour of flowers is coveted by the amateur. He well understands that no paid labour of servants could obtain for him an honour or pleasure (as the case may be) equal to seeing the offspring of his own creative genius matured into superlative excellence. It is this feeling that induces the florist to watch with such patience and perseverance his floral possessions—almost envying the season which brings to maturity beauties he fain would never lose. Another motive for the employment of time in Floricultural pursuits may be suggested in the interest many parties evince in adapting the precepts of science, and the principles of art, to the laws of nature. The scholar, wearied with the profundity of his research after hidden truths, seeks among his flowers a lighter field of study; his mind already prepared to admit the stupendous magnificence of nature, he selects, with a due share of admiration for all, a few favourites to exercise his abilities upon; and, bringing to bear on this point his acquired information on many others, soon learns the art of cultivating them to perfection. It is to assist in such undertakings that I shall from time to time submit my system of Floriculture, and hope, by smoothing the path to floral distinction, to place Fame at the command of all those parties who consider her honours worth contending for. The man of fortune finds employment for his wealth in purchasing the newest and rarest flowers ; but we will venture to say, that gem most prized amidst his varied and valuable possessions, is the one called into existence by his own powers : it becomes at once an object of ambition both exciting and gratifying, and speaks more for the good taste of its owner than all that wealth can purchase of the works of others. Ask the first gentleman you see, if the flower which adorns his coat is a self-created variety ; and should it be so, watch with what earnestness he alludes to its properties and describes its beauties; and, even admitting that it prove but an adopted pet, you will see how readily its owner will enter on the discussion of its merits, comparing it with others in his collection or in those of his friends, obliging you with its botanical nomenclature, and such other information, as will convince you that he wears the floral gem with due appreciation of its value, and not as the mere toy of a moment, of which he knows nothing and cares less.

If the pursuit of Floriculture requires any further advocacy, let it derive its crowning inducement from the favour it has found in the estimation of ladies of rank and talent, who have not hesitated to adopt the science as their own. Health may have dictated it—taste, we know, has fostered it ; and it is equally certain that fashion, in the nineteenth century, has stamped the wanderer her adopted. As such, I present it to the world—assuring my readers that it shall be my constant and undeviating practice to offer such seasonable suggestions on the choice and management of flowers, as will not fail to facilitate their cultivation, and secure ultimate perfection. Having occupied the limits assigned for this portion of the work, I have only to submit my intention of bringing under the notice of my readers the Auricula, the Polyanthus, and the Primrose, in the next Number, when I shall enter upon their history, cultivation, and choice of varieties, inclusive of their diversified habits and requisite treatment : hoping by such means to convince the admirers and patrons of Flora, that they have at least one faithful servant.

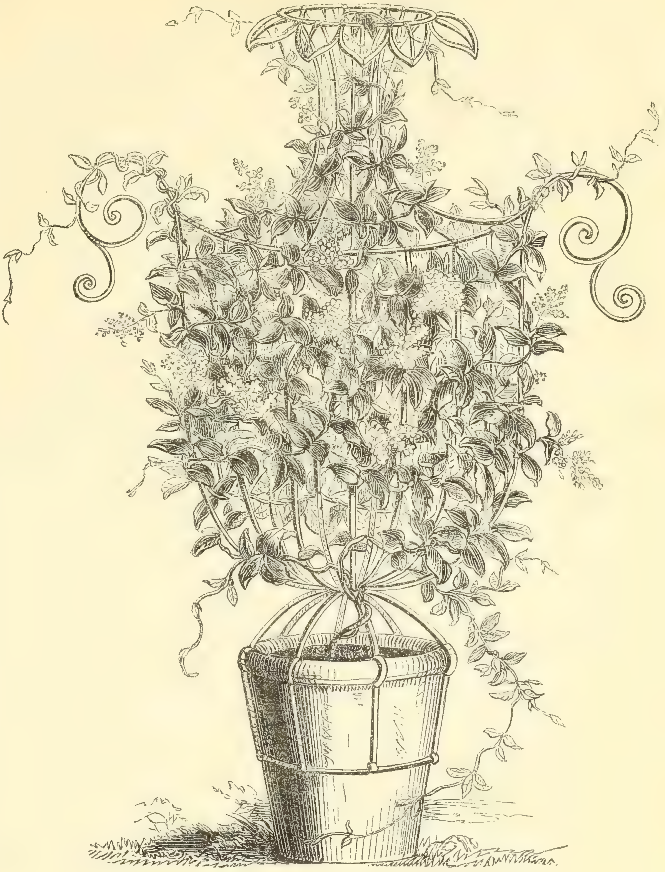
ADAPTATION AND TREATMENT OF COMBRETUM PURPUREUM, AS AN EXHIBITION-PLANT.

By Mr. W. Wood, Fishergate Nurseries, York.

Amongst the many ornamental exotic sub-climbers adapted for the hothouse and warm conservatory, there is perhaps not one within the compass of our experience that has, since the period of its introduction, won a greater share of admiration than the one to which the following remarks are given,—not one more unique and beautiful in its large and brilliantly-expanded racemes of starry purple-crimson blossoms, and none which prefers a stronger claim, or produces a higher interest, when seen as a first-rate specimen of culture.

Almost the only position in which it has hitherto been successfully grown, is, when planted within the pit or ground-border of a hothouse or warm conservatory, where, if placed under proper conditions, it appears in its season, as an indispensable ornament. The principal reasons assigned for its slighted interest as a plant for pot-culture, are, 1st, the comparative difficulty of obtaining an annual extent of growth equal to the desired amount of bloom ; and 2ndly, the occasional absence of bloom *when* sufficient growth is obtained. Admitting these reasons as the cause of its general absence in nearly all the plant-collections for competition, up to the present period, the following explanatory remarks are offered, in relation to the essential condition for its successful culture in pots,—practically, and physiologically considered.

Although it is generally admitted, that a modified temperature is the principal agent, for obtaining a maturity of growth most favourable to fertility in plants generally, it is a fact, which yet remains to be duly appreciated, in its application to the highest results in culture, that there are a select number of tender exotic plants, which demand an unusually high temperature, during their primary stages of periodic growth, to ensure that extent which is equal to a due amount of bloom ;—and hence it is inferred from all sound practice, based upon undeniable principles of physiology, that where the progressive vigour and health of plants is sought, in connection with their annual amount of fertility, the extent of annually re-accumulated vigour, equal to its production, can only be attained by their exposure to a given degree of heat for a given period, *previous* to that requisite modification of temperature which alone is favourable to the formation of bloom. Amongst hothouse plants (to which the present remarks specially refer), those of a ligneous or hard-wooded structure appear to require a stronger heat to develope their highest vigour. As a general rule, applicable to the same class of plants under artificial culture, whose growth appears perceptibly checked by a diminution of heat, it may be expressed as follows:—A progressively high temperature is favourable for plants generally, *during their season of growth,* in proportion to their slow circulation of sap, and the tardy development of their buds, and also for such as are dependent for their amount of fertility upon a rapid and annually re-accumulated vigour of growth. In the former class it will at once be seen that the genera Combretum, Rondeletia, and the wooded-stemmed species of Clerodendron and Gardenia, are included; also the species of Brownea, Croton, Elæocarpus, Jonesia, &c.; and as examples of the latter are conspicuous,—the gross habited species of Clerodendron, Aphelandra, Poinsettia, Erythrina, Æschynanthus, &c.



A high temperature becomes an evil only when injudiciously applied, either by its protraction over-night, or beyond the period when the requisite amount of growth is obtained. It is, in fact, an evil of *continuance* rather than of *degree.* That instances have been recorded of plants, which have been known to bloom remarkably fine after exposure to an exceedingly low temperature, as in Combretum, does not in the least invalidate the evidence, that a high temperature is generally, if not always necessary, to that renewed vigour of growth, which necessarily precedes a natural and healthy expansion of bloom; and is invariably connected with that constitutional vitality, which is equal to successive efforts of growth.

As regards the practicability, of obtaining *bloom* from plants under peculiarly favourable circumstances of low temperature, it should be remembered, that the actual conditions under which the preceding *growth* of such plants has been obtained, materially affects the evidence accompanying any given rule of application for obtaining similar results, in the absence of a correct knowledge of such conditions.

There is a well-authenticated and interesting fact related of a large specimen of Combretum purpureum, planted out in the ground-border of a hothouse, which, for unexplained reasons, was left exposed to the severity of an entire winter, by the lights being removed, but which on being replaced in the ensuing spring, the plant progressively attained a vigorous growth, and expanded its magnificent racemes of bloom during the summer. This most remarkable instance of fertility, under circumstances otherwise sufficient to affect its vitality, is easily reconciled with the principles of culture and conditions now insisted upon, as essential to its successful growth in pots, and in favour of which, it may be regarded as a most valuable illustration, when it is considered that a simply opposite treatment, by permitting the internal temperature of the house, to rise to that intensity during the summer, of which the plant is well known to be capable of enduring, would alone prove sufficient to a vigour of growth equal to its highest fertility.

The capability of a plant which is a native of a very hot climate, not only existing under such an amazing disparity of temperature, but maintaining an amount of vitality equal to that described, can only be accounted for, by a consideration of the physiological structure of this, and all similarly organised plants ; in relation to the laws which govern the atmosphere around them, and which may be defined as follows :—Plants are capable of resisting cold, and opposite extremes of temperature, in proportion to the small amount of fluid matter contained within their organs, and *vice versâ;* and also in proportion to the capability which their roots possess, of imbibing nutritive properties in such positions, as exclude them from the action of the atmosphere and radiation of heat.

Those who are acquainted with the habit and structure of the plant now referred to, will recognise its remarkable fitness for the position described, especially when it is remembered that the plant was placed within a ground-border, and its most important root-organs preserved from all the parching and impoverishing influences, to which plants in pots would otherwise be exposed ; and consequently it is affirmed on the evidence of practical experience, that had the plant been placed under artificial conditions of growth, any course of after-treatment, however judicious, would have produced very different results. These views of the instance cited, are strongly corroborated by the fact of the earth's greater uniform temperature at any given depth, than on its surface, and from which law, in reference to the present subject, it may be inferred, that the nearer the conditions of nature, under which the maturity of growth in plants is obtained, the more uniform and favourable it will be to fertility, and the less liable to suffer from external vicissitudes of temperature, and *vice versâ.*

Those who seek to attain the highest results of cultivation, should observe the important distinction between strictly artificial, and natural conditions, (the former in pots, and the latter in pits, or ground-borders), involving, as it does, essential points, especially with regard to temperature, and upon the observance of which, the successful application of general rules more or less depend. For example, in the former, it may be assumed as a positive and invariable rule, that a progressively high temperature during the season of growth, is essential to plants whose continued fertility depends upon an annually re-accumulated vigour in their root-organs and leaf-buds ; whilst in the latter (culture in pits or borders), high temperature is less essential in proportion as the plants have attained a mature size and growth ; because plants under such conditions being preserved from the fluctuations of temperature, possess a greater and more uniform degree of vitality throughout their organs, which render them more susceptible of growth, and more favourable to fertility under lower degrees of top temperature, than in others, whose vigour is annually exhausted in pots, by excessive alternations of drought and moisture.

One of the most important reasons, for attaching a high value to the difference of temperature in application to the growth of plants, arises from the consideration, that the atmospheric agencies necessary for the production of *growth* and *bloom,* separately considered, are so far different, as to produce totally opposite results, and thus, equally capable, by injudicious application, of being subversive of each other's effects. In other words, the amount of heat and moisture contained in the atmosphere which is essential to *growth,* is equally unfavourable for the production of *bloom,* and *vice versâ ;* hence how valuable is that knowledge which is equal to a correct application of both, since each is of equal importance where the ultimate object of growth is required, whether of fruit or flowers. These considerations suggest the following important truth,—that however low the temperature under which plants occasionally mature their bloom, it does not legitimately follow, that an equally low temperature is favourable to the continued production of growth, requisite for similar results ; it having been shown, that the producing causes are opposite in their influence ; and, consequently, as *growth,* solely considered, is invariably antecedent to *bloom,* it follows that the efficient cause of the latter is not necessarily an equivalent in the production of the former.

The foregoing remarks involve the following principles :—

1st, Any mode of treatment which causes the formation of bloom in plants, under a lower mean temperature than that which nature has formed them to endure, is unfavourable to the constitutional vigour and maturity of growth, which is equal to the highest results of culture.

2nd, Any course of treatment which gives to plants a preponderating tendency to fertility, (from whatever cause) over their productive organs of growth, is subversive of that vitality which is essential to prolonged vigour ; the vitality of plants being affected in proportion as their collective energy is being expended in the production of bloom.

3rd, The mean amount of fertility and prolonged vigour in plants, is the result of a reciprocal action of the agencies favourable to growth *and* bloom, (separately considered), at the period assigned by nature for their respective functions.

4th, The higher the results of an accumulated growth in plants, towards an ultimate effect in bloom, the higher are the agencies of air, light, heat, &c., required to produce them.

The following instance shows a practical application of the theory propounded in the foregoing remarks. Amongst a miscellaneous collection of hothouse plants, the potting and superintendence of which was under the writer's charge, in July, 1847, was a strong plant, tolerably well branched, of Combretum purpureum, in a half dormant state, within a pot of eleven inches in width. It was freely divested of its exhausted soil, preserving with care the straggling main roots, and small amount of young fibres, and thus re-potted with the sole intention of re-accumulating an amount of vigour equal, if possible, to the mean strength of its stems, by placing it within a pot of fourteen inches diameter, having about two inches of progressively coarse bottom drainage, over which was placed a distinct and heavy strata or layer of knobby portions of dried peat, well pressed, and using nearly equal parts of friable, sandy, turfy loam, and well-decayed turfy heath-mould.

The plant was then placed upon the surface of a newly made vinery tan-pit for a few weeks, until symptoms of vigorous growth appeared, when it was half-plunged in the same position, and, as it progressed, it was three-quarters plunged, with an inverted dish placed beneath the pot. The temperature of the house was, in a great degree, maintained to suit the plants within it, varying from 65° to 80° by day, and 50° to 60° by night. The most material points of management were, with regard to ventilation, as early an admission of air as the external atmosphere would permit, thereby admitting of an early removal, and closing with a high, moist, genial temperature. With this treatment, the growth became remarkably vigorous, respectively from twelve to eighteen inches in length, while, as it attained maturity, the pot was gradually re-lifted to the surface, and the plant remained in the same house throughout the autumn and following winter, under a temperature of 50° to 60°, which appeared just sufficient to enable it to retain its foliage until the summer of 1848; when the matured growth of the previous summer and autumn, on being exposed to a genial stove-heat, expanded from its elongated axillary leaf-buds, fine large splendid racemes of bloom, one of which was nearly two feet long, and eighteen inches wide ; and, after remaining an object of extreme beauty for some time, it formed in July one of the large premium-collection of plants at the great Horticultural Exhibition in York.*

The interest and merits of this species is too generally well known, to need any further eulogium upon its attractive features, and as it so seldom appears amongst the competition groups at the great metropolitan fêtes, for the reasons previously given, the evidence now offered proves that where size and vigour of growth is present, aided by a temperature equal to what its natural habit demands, it may, by suitable management, appear as one of the most beautiful and gorgeous objects yet introduced. One motive alone remains to test its capabilities. Were special premiums offered for the finest productions, it would ere long be placed in the very highest rank of splendid flowering exotic shrubs.

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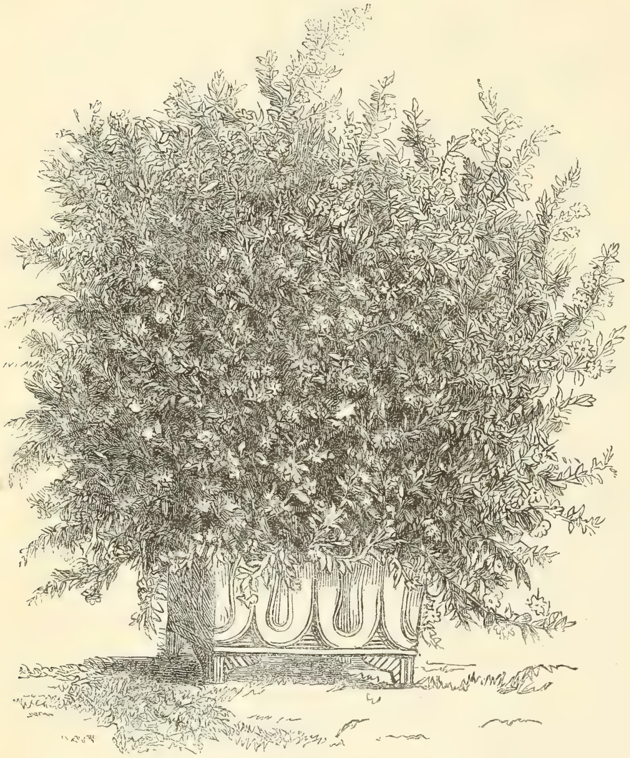
* The plant was trained upon a flat fan-shaped wooden trellis, about two and a half feet in height.

NOTES ON THE HISTORY AND PROPER TREATMENT OF THE CALIFORNIAN ZAUSCHNERIA.

By Mr. George Gordon, A.L.S., Superintendent of the Ornamental Department in the Garden of the Horticultural Society.



No plant can be more desirable for general cultivation in the flower-garden, than that which is perfectly hardy, and at the same time continues in bloom constantly during the summer and autumn months, without the trouble or expense of Verbenas and other plants requiring protection during winter, as well as propagation and replanting every season. The beautiful *Zauschneria californica*, being one of this description, a short account of its history and cultivation may not prove uninteresting. Its treatment is easy, but like many other plants, newly introduced, is not properly understood, and in consequence, is frequently subjected to a treatment very different from that which it enjoys when in a state of nature; and by which very frequently much injury is done to the young plants, through too much care or kindness, for nothing is more injurious to a truly hardy plant, than an excess of either heat, moisture, confinement, or a combination of them; the young plants by these means become debilitated, or what is termed drawn up spindly, and consequently flower imperfectly; this having been the case in several instances this last season, with the *Zauschneria*, I am anxious to prevent its recurrence.

The *Zauschneria* was first discovered by the late Mr. Menzies, who was attached as botanist to the Vancouver expedition round the world, during the latter part of the last century, and who reported it to be a plant of extraordinary beauty, with brilliant scarlet flowers, resembling those of the old Fuschia coccinea, but in an upright position. It was afterwards scientifically made known from dried specimens by the Bohemian botanist Presl, who gave it the name of *Zauschneria*, and described a second species from Mexico, very much resembling the Californian one. Douglas also found the plant when in California, but was unsuccessful in its introduction to Europe. Nothing more was known of the *Zauschneria*, until the Horticultural Society dispatched Mr. Hartweg to California in search of new plants, with instructions to seek out this plant as soon as possible, and transmit seeds to the Society. On his first arriving at Monterey in Upper California, he made search for the plant, and soon discovered it growing on the mountains of Santa Cruz, on the north side of the bay, distant due north from Monterey, about twenty-five miles, beginning to flower in June, but afterwards abundant on the outskirts of the woods and in open dry places in various parts, flowering constantly from June to November, during which time scarcely a drop of rain falls. The summer heat, however, of Monterey is seldom very hot, ranging from 62° to 65° during the daytime ; and the rainy season commences in November, and continues for several days without intermission, and finally terminates by the end of March ; shortly afterwards the Prairies teem with floral beauty, and immense fields of such plants as Escholtzias, Lupinus nanus, Collinsia bicolor, Leptosiphons and Nemophila insignis, appear in full bloom, each kind growing in a mass by itself ; but as the dry weather sets in shortly afterwards, all soon becomes a dry barren waste, and only trees and shrubs remain green, except those few herbaceous plants which are located in moist situations, but amidst all of which *Zauschneria* flowers in the greatest perfection.

No plant can be of easier cultivation than the *Zauschneria californica*, for it grows freely in any situation or soil in which a Verbena will grow, and is as easily increased from the young shoots in spring or summer. Plants struck in March or April will begin to bloom freely in June when planted out. It also seeds freely, and if sown and treated like a half-hardy annual in spring, will flower by the end of July, and continue so until cut off by the late autumn frosts ; and as the colour of the flowers (bright orange scarlet) is seldom to be seen amongst hardy bedding-out plants, it will make an exceedingly good contrast and a very desirable plant, being bushy, and growing from one to two feet in height.

CHISWICK, *January*, 1849.

HYBRIDIZATION.

By M. D. Beaton, Gardener at Shrubland Park.

THE practical application of hybridizing, or cross-breeding, has not kept pace with the progress of improved cultivation, for the last dozen or fifteen years—although the scientific bearing of the subject has been fully explained, and widely circulated during that time. It is true, great attention has of late years been bestowed on the improvement of a few popular genera, which has produced very marked results. But to obtain a surer insight into the mysterious process of cross-breeding, we must push our experiments much further. The power of modifying certain peculiarities in plants, which refuse to yield to the ordinary process of the hybridizer, is not at present sufficiently known to enable us to lay down rules for practice. Yet from some experiments in this direction, I am led to believe that many plants now thought to be sterile, and incapable of interbreeding with others, may be so managed by a previous course of culture, as to make them yield seed. The late Dean of Manchester—who may be said to be the father of scientific hybridizing—recently experimented more for the sake of proving the affinities of certain families of plants, than with a view to the production of improved races. Some years ago, there were a few lingering hopes entertained, that superfœtation was possible among plants, and in 1837, I suggested in the " Gardeners' Magazine," a simple experiment to prove this to be true, and which might likewise be of some service in cases of cross-breeding. It was to place pollen on one division only of a divided stigma, to see what effect it had on all the ovules in the germen. If it was found to fertilise all the ovules, then to apply different pollen to each division of a stigma, and thus induce superfœtation. Mr. Herbert took up this point with the ardour of youth—he soon ascertained that pollen placed on one division of a stigma, fertilised all the ovules in the germen, but he could not make two grains of different pollen act on an ovule at the same time, as he tells us in his last paper on this subject in the second volume of " The Journal of the Horticultural Society of London." Some years since it was firmly believed, that the seedlings from a crossed flower could be altered in their constitution, or at least enlarged in their flowers, by a particular mode of managing the mother-plant while the seeds were in progress towards maturity, and this belief is still entertained by some cultivators, but is not founded on facts. When Mr. Herbert's " Treatise on Cross-Breeding" appeared in 1837, some countenance was given in it to this doctrine in the case of certain seedling Camellias, which were raised from single ones, and by a peculiar way of treating the mother-plant while these seeds were in progress, it was supposed to have induced the flowers to become double. From this I dissented at once (see " Gardeners' Magazine," xiii. 276) and declared that I could not perceive how any mode of management, could affect the offspring subsequent to the impregnation. This led to a correspondence and personal intercourse, which Mr. Herbert in the most kind and affable manner, allowed to go on for the last ten years of his useful life. He expressed an anxious desire that the point in doubt should be cleared up by a rigid course of experiments. This was in 1838, but although trials had then commenced, it was the end of 1845 before a final judgment was passed in my favour. Now, seeing that I am the party left to make the assertion, I do not wish any one to believe the result, but rather experiment for himself. Calceolaria, Fuchsia, or Pelargonium, will answer to make trials with, as being very easy to operate upon, and giving proofs in the second season. It is only necessary to be most scrupulous about the access of any pollen but the sort intended, and not to use a camel-hair brush to dust the pollen with. A brush that has been used more than once is little better than a lottery chance for experiments. Take two plants of the kind you fix upon—subject one of them to the worst treatment you can devise, after you dust the stigma, and the other just the contrary—in short any sort of treatment with its opposite will answer. I may, however, state the most severe trial that was made in the case referred to. Two scarlet Pelargoniums of one kind were planted out in rich compost under a south wall—the first two crops of flowers were cut off to give time for the roots to extend more freely. Then two of the strongest trusses of bloom on each were selected for the experiment, and all the rest were cut off, and also the shoots were stopped. A dozen blossoms on each shoot were impregnated with the same kind of pollen, and in a few days when it was ascertained that the pollen took effect—a truss from each plant was cut off with the whole length of the footstalks—these were put in a glass with damp sand under a hand-glass in the stove, where seven seeds ripened, the rest having died through this hard treatment. The two plants, with the other two trusses were petted as only experimentalists can understand. The produce of the whole is now three years old, and there is not the slightest variation perceptible among them yet. I believe, however, that sterility may be overcome in part, and some opposite characters may be stamped on seedlings, by peculiar treatment to the mother-plant previous to impregnation.

INFLUENCE OF CLIMATE ON VEGETATION.

By Mr. T. Moore, Curator of the Botanic Garden, Chelsea.

It is a very usual matter among men, for opinions to run into extremes, and this is true not only as regards matters of mere opinion, but equally as regards matters of practice. From the influence of this common course of things, gardening is by no means exempt. We may assume that it is brought to bear in this way:—In propounding and supporting some great and indisputable principle, those who are looked to as authorities, are apt to use strong expressions, not perhaps beyond what the subject justifies, but yet sufficient to give the impetus to public opinion, which, once fairly started, like the snowball, gains weight as it progresses.

It is proposed to apply these remarks to the subject of low night temperatures in hothouses, the principle of which is indisputably good, and the practice of which, both has been and is, extensively followed. Public attention has been recently directed very especially to this subject; and as in similar cases, it is quite possible that public opinion concerning it, may be carried to an extreme. For this reason, it may be well to remind those "whom it may concern," that there is a limit which may not be safely passed, in decreasing the temperature allowed at night to the plants of tropical climates, under artificial treatment. Any plant may be killed by a certain decrease of temperature, and injured though not destroyed by a less amount of decrease, as surely as that any plant may be killed by a certain increase of temperature, and injured though not destroyed, by a less amount of increase. The influence is felt in different ways, but the general results—death or indisposition—are sufficiently correspondent. The influence, moreover, is felt in various degrees, according to the previous condition of the plant, but there is nevertheless a limit both to the increase and decrease of temperature, compatible with the safety of every plant. Now, it is within the limits thus marked out, that every plant attains its perfection; and if the highest and lowest degrees of temperature that a plant will bear with *impunity*, be known, there can be no difficulty in apportioning to it the heat necessary and proper for its growth, both by day and night, nature being followed in the mode by which that appointment is regulated.

Impunity has been spoken of. Of course, this expression is intended to take into account the injury that may be wrought on the constitution of a plant, both by excitement, and paralysis—by excess of heat and cold.

The acquirement of a knowledge of the highest and lowest temperatures that each species of plant will bear without injury, is matter for direct experiment; and, in fact, can only be surely acquired by such an experimental trial with each individual species. It is certain that many plants will bear an amount of cold which, but for the knowledge having been acquired by experience, would not be credited. Probably this is the case with most plants, if not with all. Attention has, however, been a good deal averted from this view of the matter, by the practice of referring all exotic plants to an insufficient number of groups. Virtually, there are in gardens but three recognised groups of exotic plants, namely, stove, greenhouse, and hardy; and the cultivator's ideas of climate, for the most part, adapt themselves to this division. The exceptions to this, in which intermediate groups are formed, are comparatively few and rare. This requires to be exactly reversed, if perfection in the art of culture is to be obtained. Universally and not partially, it must be admitted, and practically acted on, that a greater *variety of climate* than is at present generally afforded, is required, to cultivate successfully the great variety of exotic plants, which have been introduced to our gardens from every part of the world.

These considerations obscurely indicate some of the difficulties which the cultivator has to contend with, and why it is that he finds a greater number of buildings, though of small size, more favourable to his cultivation, than the same extent of accommodation in fewer structures. Practically, it would seem desirable, where a miscellaneous set of exotic plants is grown, to provide structures, in which an average of every tenth or fifteenth degree of temperature, between 40° and 80° or 90° Fahr., may be kept up; and even some of these average temperatures, would require to be connected both with a dry and moist atmosphere. It seems to me, that the old titles of "stove" and "greenhouse," as applied to the plants of temperate and tropical climates, ought to be given up, as only calculated to mislead; and that exotic plants should be classified anew into a greater number of groups, correspondent with certain gradations of climate, adapted to meet the requirements of cultivation. This opens up the great question of Botanical Geography, a subject of the highest importance to cultivators generally.

A remark just made, might, without explanation, seem to favour the idea (already far too prevalent) that it is essential, in the management of artificial climates, to keep the temperature accurately to a certain point of the thermometer. This has no support in nature. A certain range of the thermometer should not be exceeded either above or below; but to maintain a particular degree of heat, under all circumstances, either by day or by night, is a practice founded on error, or a total misconception of a natural climate.

In considering the influence of climate on vegetation, three things must be kept in view, namely, the properties of light, heat, and moisture. No one of these may be lost sight of; and the successful imitation of a natural climate will depend on the adaptation of these, each to the other. Now, one of these, the property of light, is altogether beyond our control; therefore the applied heat and moisture *must* be adapted to the existing degree of light. An increase of heat excites growth, but growth in the absence of sufficient light is imperfect. Thus we reach the conclusion, that the highest permitted degree of heat should be coincident with the brightest light; and that in the absence of light, the lowest degree of heat sufficient for the plants, should be applied. Between these extremes, the modifications of applied heat should correspond with the modifications of existing light. The lowest degree of heat proper for growing plants may be a fixed point, or nearly so; but what the highest should be, is dependent partly on external conditions, both as to temperature and light.

CULTIVATION OF THE PINEAPPLE WITHOUT POTS.

By Mr. Fleming, Gardener to His Grace the Duke of Sutherland,
Trentham, Staffordshire.

Among the many improvements made in the cultivation of the Pineapple, within the last few years, that of growing the plants in beds of soil, heated below by means of tanks or pipes, undoubtedly stands in the first rank. Although the old method of growing them in pots plunged in tan or other fermenting material, was very successful when properly attended to; and many clever horticulturists still prefer that method; experience has satisfied me that planting out is not only more natural, but far more economical, and more generally satisfactory in its results than the old system could be under the most careful management.

It is now a general practice to use tanks for supplying bottom-heat to Pine-pits; but after carefully testing them, I am most decidedly opposed to them. In the first outlay they are very expensive, and they are inconvenient in working, as they require a separate boiler, or else the top and bottom-heat cannot be worked together; and even if the top-heat is turned off in the day, the smallest fault in the tap allows the water to escape into the lower series and to overflow the tanks.

In preference to this system, I have my pits constructed with only one series of pipes, which, after passing round the house and supplying the top-heat, return beneath the bed and supply the bottom-heat also. I am aware that many will object to this method; and I therefore think it necessary to state, that this is not an unproved idea, but that I have practised it for several years with perfect success, not only with Pines, but with Melons also. I was at first afraid that the heat from the pipes would be too drying, but by judicious watering this is prevented; as a convincing proof of this, I may mention that we have frequently found healthy roots within a few inches of the pipes.

The advocates of the tank system lay much stress upon the soil being kept in a moist healthy growing state by the constant evaporation beneath it; this, however, is not the case, as the moisture rising from the tank becomes condensed in the soil, in much greater quantity than can be taken up by the roots, and has no other means of passing off, as the atmosphere of the house is too moist to admit of a great degree of evaporation from the surface of the bed. The natural consequence of this accumulation of moisture is, that the soil becomes saturated to such a degree, that in less than a year it is no longer in a healthy state for the roots, and in the course of fifteen or eighteen months, when the fruit should be swelling, the evil has reached its climax, and the gardener who expects to see his fruit swell up to more than ordinary magnitude, as a reward due to him for a long season of care and anxiety, is frequently disappointed.

I place the bottom-heat pipes on a bed of gravel or sand, about twenty-two inches below the line intended for the surface of the bed; the space between the pipes is then filled up with coarse gravel to the depth of six inches, just sufficient to cover the pipes; a four-inch layer of oak-leaves or new tan is placed over this, leaving about twelve inches for soil, which should consist of one-third sandy peat in a rough state, and two-thirds of turf from an old sandy pasture, which should be sufficiently charred to destroy all animal and vegetable life. In planting, it is a mistaken idea to suppose that anything is gained by crowding. The size and flavour of the fruit depend very much upon the health and vigour of the plants, which in their turn depend very much upon the facility with which the rays of the sun have access to the leaves and to the soil. If the plants are crowded together, they debar each other from these advantages, and very much impede the free circulation of the air amongst their foliage. The pine naturally spreads out its leaves in such a manner as to expose the greatest surface to the direct rays of the sun; if by close planting the leaves are compelled to take an upright position, much of this elaborative surface is concealed from the sun, and is rendered comparatively useless.

Care should be taken to avoid treading on the soil either before or after planting; the best method of proceeding to prevent this, is to put the soil in for the back row first, and to plant it before the soil is put in for the remaining rows; proceed in the same manner with the second and third rows, and with all except the front one. They should be planted in quincunx order, as when so planted, they throw less shade on those immediately behind them. As each row is planted, a slight watering should be given to settle the soil, over which a thin covering of new tan should be spread. This is the most suitable thing for the surface of a Pine-bed that I have tried : its property of continuing in the same loose and open state for so long a time, is one of its chief recommendations ; it prevents a too rapid evaporation from going on, and absorbs the heat from the sun's rays better than most other things ; and after being moistened by syringing, it continues to give off vapour for a considerable time, and during its gradual decomposition furnishes gases to the atmosphere which are beneficial to the Pine. If the plants have been grown in pots previously to their being planted out, the roots should be carefully loosened out of the soil, and when placed in their new situation they should be spread out as much as possible. I consider it an excellent plan to appropriate the front row to the suckers, as by so doing, a succession-pit is not needed ; but every pit may contain a few rows of fruit-bearing plants. A portion of rough new tan should be mixed with the compost for the suckers, as when so prepared, the plants will move with a fork full of it attached to their roots.

As soon as a fruit is cut, the plant is pulled up, about half a bushel of the exhausted soil is removed and replaced by the same quantity of new compost ; the best plant is then selected from the front row, and planted in place of the old one, and the place in the front row is filled up by another sucker ; this goes on for two, three, or more years, until it be thought advisable to renew the entire bed. The plants should then be carefully taken up and set in a close shed, while the old soil is being removed and the new bed prepared ; after which the plants must be returned to their places. With shading for a week or ten days, and a genial growing atmosphere, they will be in a better state than before they were moved.

I find no difficulty in moving the plants in any stage or at any season, and in general they seem to grow more vigorously after they have been taken up and replanted. I may here mention that a plant shifted with a ball of earth has a decided advantage over one planted out of a pot ; for although a few of the longest roots have their points shortened, yet plants grown in the open bed have always a supply of fine young feeders, of different lengths, radiating from the stem in every direction ; these, as soon as placed in the new compost, are ready to take immediate advantage of their improved circumstances : the plant from the pot, if much matted, is some time before it finds its way freely into the soil, and if any attempt is made to unwind its roots they are almost certain to be damaged, and the plant has to send out new roots from the stem before any great progress can be expected. I am aware that some gardeners have time to watch their plants, and pot them a few at a time, just as they require it ; of course they are safe from the evils arising from matted roots ; but there are many, who, from press of general business, seldom find leisure themselves to examine so closely the wants of individual plants ; still less able are they to give them attention the moment they require it.

In consequence of the amazing rapidity with which the Pines make their growth when treated on this system, it becomes necessary to give air much more abundantly than we were wont to do on the old method of pot-culture : if we did not pay particular attention to this point, the plants would scarcely support their own weight. I think we cannot do better than take a lesson from nature, with regard to giving air to the Pine-plant. In the West Indian islands, of which the Pine is a native, the temperature is very high, ranging between 80° and 96° in summer during the day, and seldom falling lower than 69° in winter. But we must also take into consideration that light is much more intense under the tropics than in our island, and that our temperature must be proportionate to the strength of the sun's rays. The heat in their native isles would be still more intense, were it not moderated by a breeze, which sets in from the sea, about nine o'clock daily, and continues till sunset. To imitate this, we should keep up a high temperature in the day-time, by fire-heat if necessary, and give abundance of air during the day, by tilting the lights, both back and front. In very dull, dark weather, a more moderate temperature should be maintained; as every gardener knows, or ought to know, that high temperature in dark, dull weather, is injurious to the health of plants. The facility with which the sea breeze may be imitated, is one of the advantages arising from making the same series of hot-water pipes produce both top and bottom-heat. As the latter must be kept up by fire-heat, top heat is unavoidable, and this renders it indispensably necessary to give an abundant supply of top air. A little air should also be left on at night, except during very windy weather, or when the air is very keen and frosty. A high night-temperature should at all times be carefully avoided, as I feel satisfied that nothing is more detrimental to the healthy development of both plant and fruit: the night-temperature should range from 50° to 65°, according to the season and period of their growth. I would here beg leave to remind my readers, that this is not merely theory advanced, but proved by practice, and it is to this assimilation of their treatment to those circumstances, in which they are placed in their natural habitat, that I attribute the degree of perfection which our fruits attain, both in size and flavour.

I may mention another useful lesson which we may learn by studying the natural climate of the West Indian islands. Notwithstanding the intense power of the perpendicular rays of the sun, the vegetation of these islands is protected from bright gleams by a succession of light flying clouds, which, during the hottest part of the day, in the most sultry months, continually pass over the sun, and by interrupting its rays, contribute to moderate the heat. From this we may exactly understand when it is necessary to use shading. It will require more particular attention when several days of dull weather are succeeded by very bright gleamy sunshine; and the plants, whose fruits are approaching maturity, should be especially guarded from these scorching rays, as it frequently happens that splendid shows are ruined in appearance by a little neglect in this particular; while, by paying careful attention to shading, and by keeping up a moist atmosphere, many ounces may be added to the weight of the fruit; and if due care is paid to ventilation, as before recommended, this may be effected without deteriorating its quality.

With regard to the use of manure-water, I consider that under the planting-out system, its application, during the growth of the plant, is rather injurious than otherwise. As the plants are not confined at their roots, as they are when grown in pots, stimulants, in the earlier stages of their growth, are unnecessary, and cause them to grow too luxuriantly for the proper elaboration of their sap. As soon as the fruit is set, manure-water may be applied with very great advantage until the swelling is completed; at this time, the whole energy of the plant is directed to the perfecting of the fruit, and by using liquid manure we do not merely assist nature, but stimulate her to do her utmost. The liquid, when used, should be perfectly clear, and should be applied over head until the fruit is more than half swelled. As it is essential that the liquid be quite clear when used, it is worth while to be at a little trouble to obtain it in that state, not only for the use of Pines, but for general purposes. It may be most systematically manufactured by having two tanks constructed, either of iron, or of brick and cement; the latter, being the cheaper of the two, is to be preferred; the two tanks should be placed side by side, and the bottom of the larger one, which should be capable of holding from sixty to one hundred gallons, according to the requirements of the place, should be nearly on a level with the top of the smaller one, which should be large enough to allow of the water being laded out with a large watering can. If regular *midden soak* is not come-at-able, the very best of manure-water may be made by collecting the droppings from a sheep pasture, and liquefying them in the tank. The manure-water should be poured into the larger tank, and about a bushel of soot added to every thirty gallons of liquid: after these ingredients have been well mixed, a few spadesful of charcoal may be thrown in, which acts as a clarifier; after all sedimentary matters are precipitated, the clear liquid should be drawn off into the smaller tank by means of a tap or plug placed a few inches from the bottom of the larger tank. The soot, besides contributing to the vigour and health of the plant, possesses the valuable property of destroying whatever animal life the manure may contain, either in the egg, larva, or more perfect stages.

By planting the pits at different seasons, and by filling up all vacancies as soon as they occur, a succession of fruit may be depended on at all seasons of the year; as the period of time requisite for bringing a fruit to perfection varies from eighteen to twenty-four months.

The great advantages of this system over the old, troublesome, and often tantalising one of pot culture, consist in the perfect control which the gardener has over his plants, and the power it gives him of supplying not only the exact amount of top-heat he wishes, but he has the same control over the bottom-heat also. There is no danger of getting the plants burned at one time and starved at another, and with the removal of these difficulties, the never-ending expense and trouble connected with the moving of the plants, and the renewal of the tan, is almost entirely done away with. Under the old system, it frequently happened that a whole pit was thrown into fruit at once, causing a glut at one season, and a corresponding deficiency for months afterwards.

It has been urged against this system, that it takes away from the cultivator the power of retarding or advancing the maturity of a fruit, to meet any particular demand; this, however, is a mistaken idea, as the plant may at any time be lifted with a good ball, potted and placed wherever the operator may deem fit.

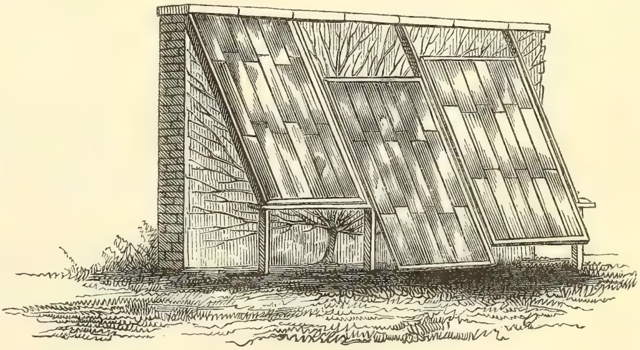
Nothing could be more convenient than the order in which the Pines throw up their fruit. The Montserrat and Black Jamaica have a natural tendency to come up in autumn, while the Queen (Ripley of course) comes up more freely during the spring and early summer months. This is exactly as we would wish it, as nothing can surpass the excellence of the Queen Pine for summer use, but for winter the Montserrat and Black Jamaica are for many reasons preferable.

In conclusion, allow me to express a hope, that my brethren will not neglect to chronicle any improvement which they have made in the cultivation of this fruit, as I still believe that, notwithstanding the many improved methods of practice which have been introduced of late years, much more remains to be found out.

COVERING GARDEN WALLS WITH MOVEABLE SASHES TO PROTECT AND FORCE THE FINER SORTS OF FRUIT IN WET SUMMERS.

By Mr. W. Tillery, F.H.S., Gardener to His Grace the Duke of Portland, Welbeck, Notts.

The new method of Mr. Ker's of covering ground with moveable sashes to grow Peach and Nectarine trees, brought lately into notice by Mr. Rivers, is a step in the right direction, and, in the words of Dr. Lindley, promises to be the beginning of a new era in English gardening. About thirteen years ago, in the gardens at Fullerton House in Ayrshire, I remember to have tried May Duke and Morello cherries on a trellis; the situation was on a sloping bank, with slates placed on the earth to reflect heat; and the distance between the slates and trellis was about eighteen inches at the back. The trees were not covered with glass, but only trained in that fashion, on purpose that they might be the easier covered with nets to preserve the fruit till the latest period. The fruit was remarkably fine, as fine as I ever saw on walls, and ripening nearly as early. Mr. Ker's mode of covering with glass will be the means of protecting the blossoms from spring frosts, as well as ripening the wood in wet sunless summers. My predecessor here (Mr. Mearns) tried to force Apricots along with Peaches and Nectarines; but it was found that without giving a great deal of air and attention at the blossoming and setting of the fruit, success was not commensurate with the expense of having a hothouse for the purpose. He therefore planned a portable wooden house merely to protect the blossoms in severe weather, and it has answered admirably since. It was to follow up this mode that I covered last May one-half of a wall 300 feet long, with some loose sashes that had been used for covering two long vine borders. The trees on the division of the wall that I covered were principally Peaches and Nectarines, and I found that they ripened their fruit two weeks sooner than those on the open walls, and made an excellent succession to the late Peach-house. Had I been able to have had the lights on at the flowering period, I have no doubt but they would have ripened still earlier. We all know, that with the exception of the month of May, the past summer has been a most wet and ungenial one for our finer sorts of fruits; but some of these Peaches and Nectarines were as fine as I have ever had them, and well coloured. Another great advantage is getting the wood well ripened in the autumn, which can be done thoroughly by this mode. I intend,



when the whole 300 feet is finished, to have on it Plums, Figs, and a few of the best keeping Grapes, such as West's St. Peter, Muscadine and Hambro's. The wall is heated by flues, and from the limited space between the sashes and the trees, the heat is quite sufficient to keep off frost and dampness.

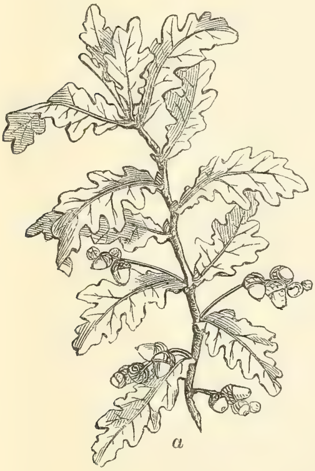
It will be seen, by the annexed Sketch, that no great expense is necessary except for rafters, and these may be made in the roughest and cheapest manner. In giving air, the lights are allowed to rest on the ground; but when fitted close, a screw in the middle of each light fixed in the wood they rest upon, will keep them firm in their places. I leave the two-feet space below them quite open, but have a small door at each end of the wall to prevent strong draughts of air or stormy winds from shaking the lights off.

December 1848.

BRITISH OAKS—THEIR SPECIES, VARIETIES, USES, AND CULTURE.

By Mr. C. M'Intosh, Gardener to the Duke of Buccleuch, Dalkeith Palace.

It was justly remarked by Mr. Loudon that, "the Oaks, in point of usefulness to man, are only to be equalled by the Pine and Fir tribe. The latter may be considered the domestic, and the former the defensive, trees of civilised society." Of these we have two recognised species indigenous to Britain, the *Quercus pedunculata,* (*a*) and *Q. sessiliflora* (*b*), and of each of these, many described, and undescribed varieties.



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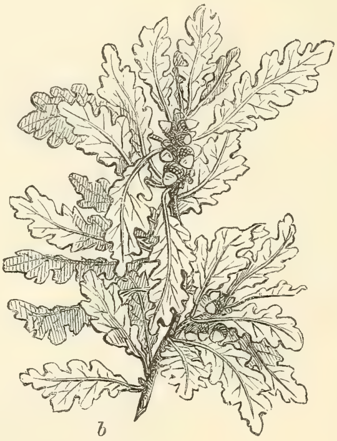

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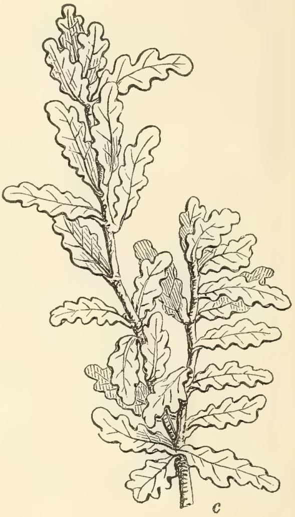


c

The utmost confusion exists in cultivation in respect to these two species, and this must ever be the case whilst the seeds are gathered indiscriminately, and the culture of the trees carried on in the same way. When we state that the latter species will thrive in extremely poor soil, in which the former would make but little progress, it may induce planters to pay more attention to collecting the seed.

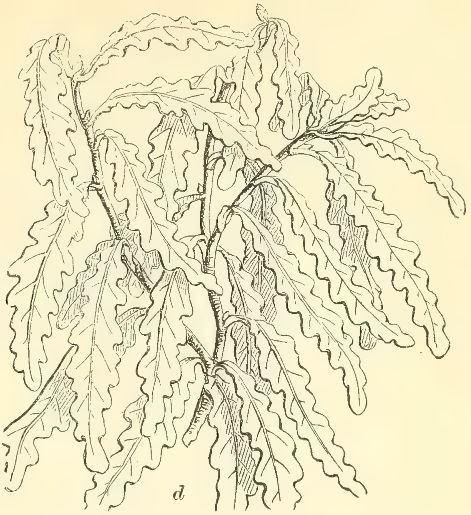
The specific distinction between the two species is,—that in the former, the leaves are on very short footstalks, of an oblong form, smooth, dilated upwards; sinuses rather acute; lobes obtuse. Stalks of the fruit elongated. Acorns oblong.

In the latter the leaves are on longish footstalks, deciduous, smooth, and oblong; sinuses opposite, rather acute; lobes of the leaves obtuse. Fruit sessile. Acorns oblong.

The varieties of *Q. pedunculata* worth our notice are *Q. p. fastigiata* (*c*), the *Q. pyramidalis* of the gardens. This is a very interesting and distinct variety, resembling in habit the Lombardy Poplar, and producing the same spire-like effect in landscape scenery, hence a desirable tree to introduce in Oak plantations to take off that formal, and round-headed outline, the tops of the common Oaks invariably present.

It is a native of the Western Pyrenees, and also near Bordeaux, but in no case abundant. It frequently comes true from seed, but the best mode of increasing it is, by grafting on *Q. sessiliflora.*

Q. p. pendula (*d*). The Weeping Oak, a curious and rather ornamental tree. Comes often true from seed, but should also be increased by grafting.



Q. p. foliis variegatis. The leaves beautifully variegated with white, and slight stripes of red. Exceedingly ornamental, increased by grafting.

Q. p. purpurea. The Purple Oak. This tree is amongst Oaks what the Purple Beech is among Beeches.

Q. pedunculata, is found in all countries where it is indigenous, in richer and better soils than *Q. sessiliflora,* and will not make the same progress if planted in a poor soil. "When both Oaks are planted together in good soil, the Red Oak (*Q. sessiliflora*), outgrows the White Oak (*Q. pedunculata*); and when either oak grows on particular descriptions of soils, with bad subsoils, the wood assumes a brown or dark colour, and is found, when worked up, to be of comparatively short duration. Hence, a good deal of confusion has arisen as to the comparative value of the wood of these two species. For splitting, the White Oak is to be preferred; and, with respect to durability, we believe that depends more on the soil, and on the rapidity or slowness of growth, than on the species."—*Arbor. Brit.*

The varieties and sub-varieties of *Q. sessiliflora* are scarcely worth enumerating in point of value as timber trees, to which we are now alluding; nor need we be surprised at the number of sub-varieties noticed by botanists, when one gentleman alone has described fifteen found in one forest in Warwickshire.

"*Quercus sessiliflora* is generally the only British Oak found growing naturally in poor soils. On the poor soils of the north and middle of France, it is the only Oak which is indigenous. The Oaks of the Bois de Boulogne are entirely of this species; as are those in the woods of Meudon, and throughout the whole of the extensive forest of Fontainebleau. In Britain it is also often found in rich soil, with or without *Q. pedunculata:* but the latter species is never found indigenous, on soils so poor as those in which *Q. sessiliflora* is found." —*Arbor. Brit.*

The oak in modern times, is never to be met with in perfection, except in a good soil and temperate climate, and hence it is planted in our lowland districts, and in soils considered too good to occupy with larch or any of the pines. Hence we have no oaks in Scotland either of a size, or in number equal to those found in the warmer climate and richer soils of England; nor is it quite evident that the oak is making the same progress even there, that it did five hundred or a thousand years ago. There seems to be a lapse—a period as it were—between the gigantic oaks in Sherwood Forest, Windsor Park, Castle Howard, and in those of Holme Lacy, Garnons, Moccus Court, and other places in Herefordshire; and those of a more recent origin, in the same localities. The oak called *par excellence,* "The Duke's Walking-stick," in the park at Welbeck, I predict will never attain the colossal dimensions of the Porter's oaks, the Greendale oak, or the Butcher's shambles, although only a few miles distant, and on the same property, and to all appearance growing in the same soil, and at little difference of elevation, and even if my recollection be correct, the "Walking-stick" is less elevated in situation, to any of the others; and has the advantage, if advantage it be, of shelter, being surrounded by other trees.

In Scotland we have the majestic oak at Methven Castle, that at Seggiedean, the branches of which cover an area of not less than 4900 square feet; those at Hamilton and Dalkeith are also large, and in both the latter places not single trees, but the fragments as it were of "The Ancient Sylva Caledonia." These, however, may be said to be growing in good soils, and a good climate. But again, we have recorded by Dr. Walker, in his

"Essays," p. 9, the particulars of an oak growing on the north side of Loch Arkeg, in Lochaber, which at 4 feet from the ground, measured 24 ft. 6 in. in circumference; and the celebrated "Pease Tree," on the property of the Lockharts of Lee, in Lanarkshire; measuring 33 ft. in girth at 1 ft. from the ground; and 19 ft. at 7 ft. high. It is calculated to be above 1000 years old, being particularly mentioned in a charter granted to that family 650 years ago. These are growing in poor soils and in elevated and cold situations, and no trees of the same species of more than ordinary growth near them.

These facts lead to the inquiry, Has the climate of this country changed since the Roman invasion? For we are led by history to believe, that those remains of oaks often dug out of our peat-mosses, which must have been trees, while living, of far greater magnitude than any we have existing at the present day, were levelled either by them, or by some other of our early invaders. The remains of an enormous oak was dug from under moss at Hartfield in Yorkshire, 120 ft. in length, and 12 ft. in diameter at the root, and 6 ft. in diameter at the top. And Dugdale, in his work on "Embanking," p. 141, informs us, that in the Fens of Lincolnshire, oaks have been dug up which measured 16 yds. in length, and 5 yds. in circumference; no such trees exist at this day. In almost every district in Scotland trees of an immense size have been discovered, wherever excavations have been made in peaty or vegetable deposits; and what is very remarkable is, that they are chiefly oaks, and in almost every case in situations where that tree can scarcely be reared now, even when sheltered during infancy with firs, larch and other trees, of a hardier description. Our opinion of shelter will be given hereafter.

What is the cause, may we not naturally ask, that oaks refuse to grow upon the very spot, where formerly immense forests of them grew, and acquired a magnitude, compared with which, the largest oaks of modern times are as mere saplings?

Nor are these remains of ancient forests confined to Britain alone; Ireland presents them in almost every province, not only in vast abundance, but in such excellent preservation, that the timber is cut up and wrought into articles of furniture, in laying floors, &c.; and the same has been repeatedly done in Scotland. How long these trees have lain in their sepulchral abodes, we know not, only in so far as the destroyers' tools, coins, and similar relics, found near them, give us a data to calculate by. For it is ridiculous to give them an antediluvian origin, or attribute their overthrow to the flood of Noah. The marks of the tools by which they were prostrated are clearly seen on many of them, and charred fragments bear additional evidence of the manner in which they fell. It is seldom that such trees are found entirely on the surface; such is, however, sometimes the case. An instance was the other day stated to me by Mr. David Bishop, no mean authority, as being discovered by him, some years ago; an oak of large dimensions being so found, on the top of a hill in the Logie Almond range, in Perthshire, fully exposed to wind and weather, and of great hardness. This tree grew where it lies, for the root was reposing at the end of the trunk; and the situation fully 300 ft. higher than any plantation in the vicinity.

The theory of a change in our climate for the worse, has been of late years canvassed pretty freely. Amongst the highest authorities who have written on the subject, we may mention Garnett and Pinkerton, the former in his "Tour in the Highlands in 1800," and the latter in his "Geography," Vol. I. p, 70, both of whom assert, that our climate is more cold and moist than it was formerly. In addition to these opinions we may state, that the records of Religious Houses show, that wheat was paid as a tithe from lands, on which human industry could not now raise that grain. Wheat was paid annually as a tithe to the Priory of Lismahagow, from lands in that parish, on which that species of grain has not been seen for several centuries past, and where it could not now be raised: and where, under the present economy, oats can scarcely be brought to perfection. The marks of cultivation on high hills are clearly evident, and to an extent not like a slight attempt, rashly undertaken, and quickly abandoned, but having all the appearance of having been long under active cultivation.

This, coupled with the season of ripening of various fruits given by Evelyn, Bradley, Langley, and others, to which horticultural readers are referred, and also to the History of Monastic Houses, regarding the culture of the Vine, and the manufacture of wine, which even quotations from would occupy too much space here, leaves no doubt on my mind, that the climate of Britain has changed materially for the worse, and, notwithstanding the improvements in draining and a more scientific system of culture, all fall far short of compensation for the diminution of solar heat. On the other hand, the late Mr. Loudon, and a writer in the "Edinburgh Review," on "*Polar Ice; and a North-West Passage,*" think that our climate has undergone no material change during the past thousand years.

In conclusion I may add that the Roman historians, Cæsar and Tacitus, who both resided several years in Britain, affirm that the climate was in their time superior to that of Gaul (modern France), and that the vine and the olive flourished here, which in their day it did not in France. —*Vide* "Cæsar de Bell. Gall.," lib. v., c. 12; "Vit. Agric.," c. 12; and "Diodorus Siculus," lib. v., ss. 25, 26.

From the above, it clearly appears that Oaks will not now prosper at the altitudes in which they formerly grew, and there can be only three reasons assigned, for this rather extraordinary circumstance; either our climate has changed,—the constitution of the tree has altered, or our system of arboriculture is not in strict accordance with the laws of Nature; for be it remembered, it was her all-wise hand that planted, or rather sowed the seeds of these "Monarchs of the Grove," whose remains we have above alluded to, and also those vast forests with which the whole of Britain was, at one period, nearly covered. That the climate has changed within the last thousand years, there can be little doubt; but from what cause is not easily explained. That the constitution of the Oak has undergone any material change, I cannot think, but I do believe that our system of management is almost the antipodes to the laws of nature; and in another paper I shall endeavour to demonstrate this fact.

ON ORNAMENTAL PLANTING.

By Mr. Kemp, the Park, Birkenhead.

More than half the beauty of a district, and nearly all the interest and character of a private domain, depend upon the manner in which it is planted, or naturally clothed with the higher orders of vegetation. The boldness or softness of its undulations and outlines may be all that is desirable; but it is the arrangement and grouping of the trees and shrubs on its surface, which will chiefly give to it a pleasing expression.

And yet, while a landed proprietor scarcely ever thinks of erecting a mansion without consulting a professional adviser, any ordinary gardener or woodman is often thought competent, to put on the more expressive features of a landscape; or, where the hand of taste has been originally employed to trace out the plantations, the almost equally important task of superintending the *development* of their characteristic peculiarities, is frequently entrusted to persons scarcely higher in rank and understanding than a common labourer.

But it is not merely, or mainly, to deprecate the deformities in our landscapes, which result from devolving the formation and thinning of plantations on ignorant persons, that we now address the owners and managers of landed property. Our object is to point out, in a cursory way, some of the principal things to be attended to in regard to the time and manner of planting for ornamental purposes.

Perhaps no practical matter in the whole range of gardening, has drawn forth more varied directions and statements than the proper period for planting. And this is especially the case with respect to evergreens. On a review, however, of what has been written and said, we think it plain that the weight of testimony, derived both from theory and experience, is in favour of the month of November as the fittest season for the purpose.

In support of this view, many reasons might be alleged, most of which will, perhaps, be generally familiar to our readers. November is commonly a dull, cloudy month, with a foggy or moist atmosphere, cold, yet not frosty, and sufficiently removed from the ordinary commencement of severe frosts, to permit the plants to become comparatively settled and established before they will be subjected to extreme cold. This month is also at the beginning of a long period, during which vegetation is almost torpid; and a season is thus afforded for the newly-planted trees to get domiciled (if we may be allowed the expression) before any demand is made on their activity.

All these circumstances are precisely those which are most favourable to transplanted trees or shrubs. Hazy weather, a humid atmosphere, with but little warmth to neutralise the humidity, or excite the energies of the plant into action, at a time when they are crippled and mutilated, are just the conditions which every good planter would desire at any season. Exposure to the air, the drying action of the sun or wind, and the application of the absurd and injurious practice called "puddling," are thus either avoided, or, as in the case first named, rendered harmless.

The objection to autumn planting that, in regard to evergreens, it leaves them to be blown about by the winds during winter, and particularly in the month of March, is easily remedied by affording them a little temporary shelter, such as a few fir branches placed on the exposed side would produce.

We have now before us a large extent of ornamental planting, which was effected between the months of November and June, and in the appearance of which, we have readily been able to distinguish the various periods at which it was accomplished; there being a marked difference in the growth of the plants. So great, in fact, is the distinction, that those last planted are at present, after three years' growth, fully a year behind such as were put in earliest; and the number of deaths in the case of those latest planted groups is at least, as compared with the others, ten to one.

During the winter of 1847-8, also, we had a considerable number of trees and shrubs removed, many of them being evergreens of large size, and we can now easily trace the difference, in point of health and progress, between those planted in November, and such as were necessarily delayed till March or April. Our own experience, therefore, is all in favour of autumn planting.

It is perhaps right, however, that we should here except from the rule thus laid down, such plants as, from their previous treatment, whether as greenhouse or half-hardy specimens, are, when desired to be transferred to the open ground, obviously unfit to be put out in autumn. In these instances, which should be of rare occurrence, it is most necessary that the plants should not be exposed till spring, in order that they may have the whole summer to get inured to the open air before being subjected to the cold of winter. But delicate things of this nature, will always require care in watering, in consequence of being planted so late.

As scarcely any plants will flourish well in a soil in which water lodges, or one that is very stiff and close, two of the most important preliminaries to planting are drainage, and the thorough breaking up of the ground. The former of these may sometimes be dispensed with on land that is naturally sloping, of a light description, and having a gravelly or rocky foundation. But where the ground is at all flat, or disposed to be spongy, or resting on clay, good draining must by no means be neglected.

The necessity for a proper trenching and breaking up of the soil is not, like drainage, at all dependent on the character of the soil or its position. This must always be done, whether the ground be light or heavy. The depth to which this stirring of the earth should be effected, is a matter which can be regulated by the natural thickness of the soil in the district, and the character of the lower stratum. It should never be trenched less than eighteen inches, and need not be so more than two feet.

Where, however, the soil is not naturally light, it is of great consequence to adopt all available methods for making it so, as the roots of newly-moved plants never spread kindly into a stiff soil, and their growth may be retarded for years, while they will never ultimately be so free and beautiful, unless some such modes of improving the ground be adopted. Working the earth freely with the spade, and introducing a greater or less quantity of sand, ashes, finely broken stone, lime, or manure, will be the best means of reducing it to a proper condition for receiving plants. The common practice of planting in crude earth which has merely been turned over once in spadesful, without being at all broken up, and in which the buried weeds and rubbish come into immediate contact with the newly-inserted and tender roots of the plants, is almost certain to end in more or less of dissatisfaction and disappointment.

For one of the same reasons which render light soil needful for ornamental plantations, viz., that the plants thereby acquire an abundance of fibrous roots, and are, consequently, well furnished with branchy and symmetrical heads,—trees and shrubs should always be obtained from a nursery the soil of which is light, comparatively shallow, and lying on a firm gravelly or rocky basis. Plants from such a situation are invariably better furnished with both fibrous roots and branches, can be transported far more successfully, and make the most perfect specimens.

But where a nursery of this kind does not lie at a convenient distance, one in which the system of frequent, almost yearly, transplantation is regularly practised should be used; as the practice of annual transplantation nearly compensates for the effects of a too rich, close, or deep soil.

To secure the possession of healthy and well-grown plants, care should be exercised in the selection of the stock for planting. In many of the nurseries near London, and, consequently, in most of the newly-planted places around London, the trees most used are from eight to twelve feet high, miserably deficient in branches, and altogether very defective as specimens. We could indicate more than one large public place in which the trees employed are of this description, and their present appearance is most deplorable, while they cannot ever be expected to make good specimens.

In a future article we shall describe more minutely the process of planting, and the best trees to select.

METEOROLOGICAL SUMMARY OF 1848.

By G. J. Towers, Esq.

At the commencement of a new year, it will not be irrelevant—perhaps the reverse—to review the chief phenomena of a year, which, to say the least of it, has been extraordinary in its course. The press bears consentient evidence of the fact; and every one who takes a decided interest in the weather, and its results, appears to entertain a similar opinion. Without dwelling on the astounding revolutions on the continent, and the very recent discovery of the Californian "El Dorado" (a country, by-the-by, which has been precious to the Botanist), we only name them, as adding to the catalogue of mysterious events which will illustrate the chronicles of 1848.

The phenomena that will form the subject of this first article of the year 1849, will be found to have borne chiefly upon Agriculture and its cereal productions; yet they cannot fail to be interesting to the general cultivator, inasmuch as the presence or absence of light, its reflection, refraction, and other modifications, through the medium of various kinds of glass, must produce corresponding effects. Local differences will exist at all times, and our readers therefore should be enabled to compare the facts which we lay before them, as selected from a series of observations taken in Surrey, at no great distance from the metropolis, with those which have been made in the northern and eastern counties. They will, perhaps, be found, generally, to accord with the registers of the district south of the 52° of latitude, with few exceptions.

January, 1848, might be considered a fair month for Horticulture and Agriculture. It commenced with four fine and sunny days, the first of which dawned with 1° of frost. A small quantity of rain fell in the nights of the 2nd and 3rd. The 6th was sunny, but clouds and gloom followed till the 13th, when some rain fell. The 14th was foggy throughout. The 16th and 17th were fine. On the 18th, which was rather frosty, with light haze, a beautiful double, lunar-halo (*pareselene*), adorned the heavens. The inner one, not far from the moon (then within two days of full), was richly tinted with blue and orange; the outer was pale, but completely circular: it enclosed the moon and its inner halo, also the planet Jupiter,—both being then in the sign *Gemini*. The wind was S.E., but it veered to N.E. Vapour abounded, clouds formed, and dark, gloomy weather, with very little sun, continued till the end of the month. The average temperature of all the nights was found to be 31° and a very small fraction; that of the days' maximum, 34·6°. The only period of keen frost included the 25th—28th days, when the night of the 28th marked 14°, *i.e.*, 18° of Fahrenheit. There were, in the course of the month, twelve days of north and north-east wind; six of south-easterly; three of south; and four from south to west. The gardener's attention was of necessity kept alive, by the low temperature of the month; but he had little difficulty to contend with, unless the absence of solar light might be viewed as such. The new theory, which, since the demise of its great originator, Mr. Knight, has been rapidly gaining ground, has instructed the practical man to lower his night temperature, and at all seasons to follow the indications of nature, by avoiding a strong forcing heat, when there is a deficiency of solar power.

February commenced well: the three first days fine, with sun, but the wind changed to west by south, and there followed six days gloomy throughout; much rain fell, and the temperature was extremely mild, 42° to 50°. Subsequently there were six fine days, without rain. All the others were rainy, so that the month might be considered decidedly wet. On *sixteen* days the wind came from south to west;—on *six*, at distant intervals, from west to north;—on *four*, from north, and on the remaining three, from north-east. The barometer was generally low and fluctuating, and the average temperature of the entire period was about 42° 8 cents.

March proved, throughout, to be a disastrous month. February is expected to be rainy; but when January has previously been sufficiently wet, and the second month redundantly so, the land cannot but suffer from the excess occasioned by a still greater quantity of water which may fall during twenty days of a month, wherein brisk drying currents are naturally looked for. The 3rd, 14th, 18th, 23rd, 29th and 31st were fine and bright days, the two last very warm, 60° and 70°. The phenomena worthy of a particular notice were, the barometer on the first day at 28° 90 cents., one degree of frost, early on the 4th and 19th only, the *Eclipse* of the moon on the 19th transitorily obscured by rapid succession of heavy clouds, succeeded by the *Vernal Equinox* at 44 minutes before noon of the 20th. The concomitants of this critical intersection of the two great circles, were—barometer so low as 29 in. 11 cents.; temperate heat reached at three periods, 36°, 50°, 42°; wind south-west, weather showery,—all indicating a corresponding summer. Rain and dark weather followed, with the exception of the 23rd and 24th. The barometer and temperature rose during the last week, and the weather became fine at the close of it. The prevailing winds were westerly by south for twelve days, and by north for fourteen days: the drying, lively breezes of March, from north to east, were comparatively absent. Average temperature was 43°. The gardener suffered in common with the farmer, during this long season of dark, cold weather: the ground was swamped, and labour was interrupted. In the forcing departments it becomes a question of practical importance, which we put before our experienced readers, *how far* their plants, under glass, were affected by the general absence of the sun's unscreened rays? We know that in March, and during the advance of the sun along the ascending signs *Aries* and *Taurus*, the direct ray will frequently raise the thermometer more than 40° or 50° above that which is marked in the shade; thus in March and April—when the atmosphere has been bright, the heat of a stove, with an aspect south by east, has been raised by the ray to 100° at the precise moment when an instrument suspended in the open air marked 50°. If this remark attract the notice of any one who is observant of meteorological phenomena, it may be found interesting to watch the indications of the thermometer similarly placed during the hottest days of July and August, when the course of the sun is passing through the *descending* signs of the ecliptic.

April came in, as March had terminated, fine and hot: the wind north-east on the 1st and 2nd, and southerly on the 3rd, and north-west on the 4th. These four days were splendid—minimum 47°—maximum 70° plus, on an average. Barometer 30 inches to 30·11 cents. After the new moon of the third day, the current became fluctuating. The barometer declined, the heat abated, and the fine weather left us till the morning of the 28th, when the prognostics of improvement became manifest. There were seventeen days of rain between the 6th and 29th; so that the fall of water greatly exceeded the average produced by the showers of April in ordinary seasons. All the records bear ample testimony to the perplexities occasioned by the protraction of weather so unfavourable. The average of the nights was 41·4, that of the days 54·4. The fine and splendid season of the spring dates from April 29th to May 18th—the day of the full moon—both inclusive. During this period, the sun blazed from a cloudless sky: the wind came from the east, chiefly by south. From the 18th to the 22nd a little rain fell—the mercurial column and the temperature declined. A great improvement soon took place, and the weather remained fine till the 30th, when rain set in with a decided change of wind to west-south-west. Average temperature 48° 26 and 68°. The fierce sun of this month proved injurious to crops in the fields, and to the bloom of fruit-bearing and flowering plants of the gardens: the grass of meadows and lawns was scorched also by the 24th of May, under an ardent sun which, on several occasions, raised the thermometer to 100°, 107°, and 110°, in the open air.

June proved decidedly and injuriously wet, as will be seen by the division of the periods. The first five days were rainy, wind westerly by south, in which quarter it continued till the 12th, when after wavy, cirro-stratus clouds, a severe thunder storm with heavy rain occurred. There were three fine days in this period. Between the 13th and 23rd, four days with rain, and five of fine balmy weather; wind varied between south-east and north, or north-west. The remainder of the month was wet, excepting the last day, when there was new moon at 10 h. 19 m. of the evening. Averages of the month 52°; max. 66°½.

July is expected to be showery—and therefore the occurrence of seventeen days more or less, of rain, could not be deemed altogether unseasonable. The intervals of fine weather, with sun, stand thus in our register:—4th, 5th, 6th days, wind southerly; highest temperature of the month, 79° on the 6th. The 10th, 11th, 12th, 13th partially hazy, but becoming beautifully fine—average about 71°; wind north by west to east-north-east. The 16th, 17th, 18th, 19th, north-westerly, south-west on the last day, which became cloudy. (A thunder storm on the 14th evening.) 22nd fine, but cool; wind south-west to the end, with the exception of a few hours on the 20th which, and the 25th, were pretty fine. The wind came from north and north-east only on three distant days. The lowest average temperature marked 55° 22; the highest, 69° 22 cents.

August: its first day brought to recollection the fearful storm of 1846. It did not cause much damage to glass erections, although to the agriculturist it proved truly ominous. Rain succeeded till the 7th, which was fine throughout. 9th very showery. 10th very fine, till 4 p.m.: then a powerful and protracted thunder storm arrested all the labour of the harvesters; hence we trace but four pretty fine, solitary days till the 31st: all the others being very unseasonable, wet, or overcast. The wind generally south by the west. The 31st proved fine till 4 p.m., when heavy thunder, hail and rain, came on; but this strife of the elements proved critical, and sufficed to neutralise the electricities, and confirm the trembling hopes of the farmer. The phenomena were awfully magnificent near Carshalton in Surrey, where, by one flash, a farm was struck, and suffered by fire to the amount of several hundred pounds. The barometer stood above 30 inches on the 1st, 2nd, 3rd, 4th, 7th, 8th, 9th, 12th to 19th, 30th and 31st; but it proved of little avail, as even on the finest days the afternoons usually became changeable about 4 or 5 o'clock, and rain generally followed.

September became the autumnal counterpart of May. The mercury had risen on the 1st to 30 in. 28 cents., and it remained considerably above 30 in. (on the 16th, 30-43 cents.) except a trifling decline for a day or two, till the 19th day. Weather could not be finer or more hilarious. The garden, in all of its departments, must have participated in the benefits thus conferred, and enhanced by the power of contrast. Gradually, however, the favourable concomitants receded under the influence of a change of wind to the east; and on the equinoctial day—22nd—when the sun entered *Libra ;* clouds formed on the 23rd, haze on the 24th, and much rain fell on the following days. The 30th morning was pretty fine; but cirro-stratus, and dark threatening clouds, obscured in the evening. The averages were 49° 6 per night, 64° 7 per day.

October justified the equinoctial prognostic. The four first days were changeable—a little sun, and several showers. The four following were really fine and genial; temperature from 55° to about 69°, but thence, and particularly whenever the wind came from N.E., the weather was decidedly and profusely wet. The temperature declined, and became piercingly keen on the 18th and 19th. Rime was seen on the 31st morning by the writer, but the Tables of the Chiswick gardens exhibited actual frost before that date. The averages of the month are taken at 45° 5 to 55° 55 cents.

November, by comparison, was favourable. The 1st hazy throughout—wind, E.N.E.—temperature, 37° to 46°. 2nd fine from the west. A very little snow was seen on the 1st and 5th days. The 6th to 11th, inclusive, fine and sunny, in general; sharp frost (27° Fahr.) on the 5th morning: slight rimy frosts now and then; still the average was mild; wind N.W. to N. E. Gloom and rain succeeded. On the 16th another sharp morning frost of 6° (26 Fahr.) passed away by noon, when, the wind at W.S.W. raised the degree to 45° in the shade. This direction of the current remained much the same to the end of the month. It will, therefore, suffice to state that rain fell on each day till the 23rd, again profusely on the 26th, and as a mere drizzle on the 29th. The other days were dry though generally overcast. The barometer was high from the 9th to the 18th; but its mark was rather low, that is, about 29 inches 70 cents during the other two-thirds of the month. Thermometric averages 37° 4 to 47 max. The chief atmospheric phenomena, were the brilliant meteors, and richly tinted Aurora of the 17th. One on the 22nd of October had been nearly as remarkable.

December produced sixteen very fine days—all mild till the 21st, or winter solstice, which was bright even to splendour. Then frost came on: our lowest marks were 27°, 28°, 26°, 24°, and 30° of Fahr., the last being Christmas-day; when the south-west wind raised the temperature to 45°. Alternate fine, dark, and moist intervals succeeded, and the month closed with haze and clouds. Barometer 30 inches 10 cents. Wind north-east. The rainy periods included the 3rd to 8th—14th, 15th, 16th: the last day proved the most dreary in its character that wind and driving rain could produce. The 19th, 25th, 27th nights and 30th day conclude the sad catalogue. The north-east winds seemed to settle on the 29th, 30th, and 31st. Otherwise, as during the whole year, their occurrence has been very rare.

The barometric range corresponded nearly with that of November, and the thermometer averaged 39° 2 cents as a minimum, and 46° 3 as maximum.

The fall of rain, as tabulated in the "Gardeners' Chronicle," is as follows :—

1847.	Inches.	1847.	Inches.	1848.	Inches.	1848.	Inches.
January	1·31	Brought forward	7·27	January	1·16	Brought forward	16·08
February	0·94	August	1·50	February	3·12	August	4·70
March	0·41	September	1·66	March	3·05	September	2·20
April	0·92	October	1·15	April	3·06	October	2·93
May	1·59	November	2·26	May	0·28	November	0·90
June	1·31	December	1·81	June	3·20	December	2·03
July	0·79			July	2·21		
			15·65				28·84
	7·27				16·08		

MISCELLANEOUS.

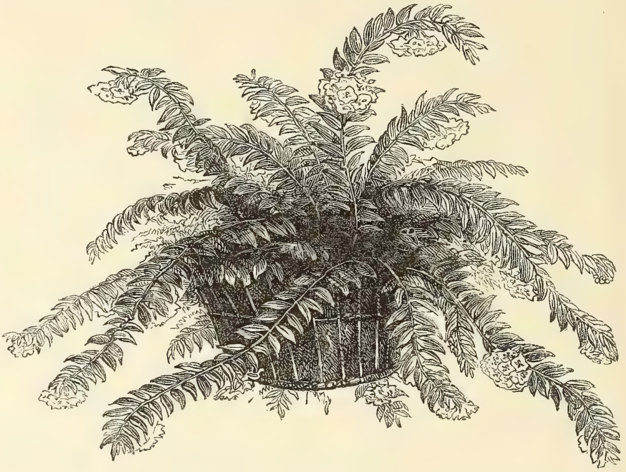
New, Rare, and Interesting Plants, in Flower in the different Suburban Nurseries and Gardens. *Aspasia epidendroides.* In the gardens of the Horticultural Society at Chiswick we found in good flower this charming species, and though not possessing any attractive colour in the flower, yet the highly aromatic odour which the flower emits, renders it one of those plants the Orchideous House or the stove should never be without. This species is the more valuable, blooming as it does when so few scented flowers are to be met with.

Corrœa var. brilliant and delicata. Two handsome little specimens of the above varieties we remarked lately in Messrs. Henderson's nursery, Edgeware Road, laden with bloom, the first one really deserves the name "brilliant," being a peculiarly bright carmine colour, with a neat habit, and foliage a bright glossy green. The second (*delicata*) is equally praiseworthy for the profusion of its bloom, the colour of which is a pale rose tint. Both the varieties were raised some two or three years ago by Mr. Gaines, nurseryman, Battersea; they are certainly the very best varieties in cultivation.

Cyanotis axillaris. In October last in the stove of Messrs. Henderson, we saw this pretty species flowering abundantly. The bright cœrulean blue of the flowers and feathered filaments of the stamen, enriched by the golden hue of the anther, make the plant deserving a place in every stove. The plant may be produced of almost any size, and, will yield a liberal amount of bloom of a colour so much in request in the stove or green-house.

Disa Grandiflora. A native of the mountains of Cabul, near Cape Town, where it grows in a wild state. At present it is rarely met with in our gardens, owing, we suppose, to some difficulty, that gardeners have not yet discovered, respecting its management, else it is one of the most charming plants for colour ever seen. The flowers are large and a bright crimson, verging upon scarlet, yellow in the centre, very attractive in colour. It was flowering a short time ago in Messrs. Veitch's collection at Exeter, where we noticed a fine specimen of

Fuchsia serratifolia, in a No. 1 pot, in most gorgeous condition of bloom. We have heard complaints repeatedly from parties that they could not grow fine specimens of this (especially) and several other of the species, however, Messrs. V. seem to have met with no difficulty in forming specimens truly gigantic, and laden with their characteristic blossoms.



Hoya bella. The accompanying vignette represents the manner in which this little gem appears to the best advantage. It is grown in a basket suspended from the rafters; you have then a full view of its crystallised flowers from beneath the foliage. The species appears to bloom most freely, has a graceful habit, with neat foliage of a good rich green colour. We noticed it in the nursery of Messrs. Veitch and Son, Exeter, in September last, where it had been flowering for two or three months. It was introduced there by Mr. Thomas Lobb, from the Taung Kola mountain, Moulmein. As a plant for the particular gratification of small as well as large cultivators, we cannot point to one species more worthy a place in every collection. It possesses in addition to its other beauties, that of being delightfully fragrant.

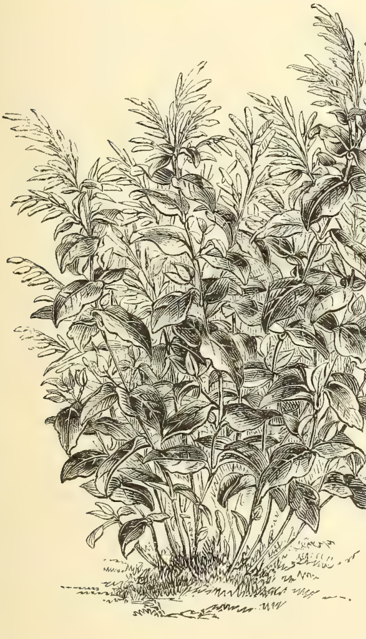
Ixora alba. This pure white species of Ixora we noticed flowering in the nursery of the above-named gentleman. It has globular masses of pure white flowers, rendered somewhat more attractive by large yellow anthers. This species is chiefly attractive by departing from the very general colour of nearly all the known species in cultivation.

Lœlia spe. nov. A singular species or most probably a variety of L. autumnalis is now in bloom in the nursery of the Messrs. Henderson. The flower is self-coloured, except that a dash of a deeper hue runs down the centre of the sepals and petals; the colour of the latter and the labellum is a pale rose. The flower in size is much like L. autumnalis, but more compact, the petals being broader and labellum shorter than that flower; the habit similar though smaller. It makes rather a pretty variety in point of colour with L. autumnalis.

Lycaste Skinnerii. Among the many varieties of this species that we have noticed, we must class a variety in flower at Messrs. Henderson's, as being equal to any of the finest in size, colour, and form of the flower. The specimen was small, but the flowers (four in number) were remarkably fine, and the plant was in the full vigour of growth.

Pelargonium scarlet perpetual. It is an acknowledged fact, that great difficulties have hitherto existed in getting the scarlet Pelargonium to flower at this season in any degree of perfection; however, we noticed in the nursery of Mr. Glendinning, at Chiswick, a few days ago, a scarlet Geranium, in most perfect beauty, the colour quite dazzling to look at; there were several other varieties, fancy kinds and the ordinary sorts, all in good flower. We understand they are the production of a gentleman's gardener in the country, who has for some time past been paying particular attention to this kind of flower for forcing, and he has succeeded most admirably, for they are without doubt the best things of the kind yet produced so early in the season; of course, the difficulty above mentioned is in this case entirely removed. We shall now have the pleasure of meeting with this choice race of flowers fine all the year round, which cannot fail to give very general gratification to all admirers of beautiful flowers.

Sericographis Gheisbregtiana. The accompanying vignette gives a fair, though small representation of the growth and habit of a specimen in good flower, at Messrs. Henderson's, Pine-apple Place, Edgeware Road. The plant was about two feet high, and eighteen inches in diameter, completely crowned with its neat racemes of rich red-coloured flowers. This plant is richly deserving of cultivation the most extensive, as it continues blooming at this dull season for two or three months. From the graceful character of its short racemes, it becomes most useful in the formation of bouquets. The habit is neat, foliage handsome, and of a good bright green. We have since noticed a fine specimen in flower, in the gardens of the Horticultural Society, the individual flowers of which were, perhaps, finer, and of a brighter colour.



Salpiglossis, spe. nov. A new species, introduced by Messrs. Veitch and Son, in whose nursery we found it blooming in September last. The plant grows about eighteen inches or two feet high, sending out branches, at the ends of which the large, broad, yellow flowers are produced. We understand it is perfectly hardy, and therefore is an acquisition, as it blooms freely.

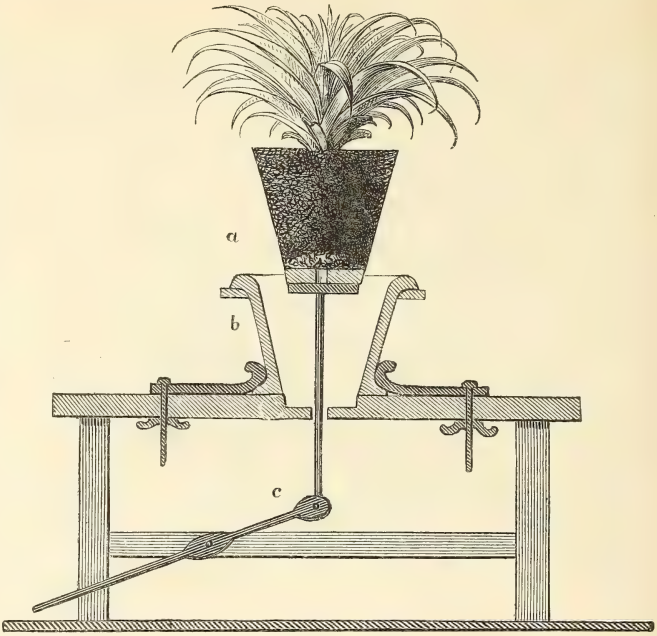
Scutellaria Ventenatii. A fine specimen of this species we observed some time ago, in the nursery of Messrs. Rollison, Tooting, densely laden with bright scarlet flowers, covering the upper part of the plant, the whole forming a handsome bush-like appearance. It well deserves notice, as a specimen plant well cultivated, equally with its own merit of being a good bloomer, and particularly attractive colour of the flower.

Thibaudia, spe. nov. Messrs. Veitch and Son have recently flowered a new species of *Thibaudia*. The habit is robust, with thick, fleshy, rich green leaves. The flowers are a crimsony scarlet, shading to white at the limb; they are produced in clusters, about six in number, on a short stem, at the ends of the shoots. The richness of the colour will be a great attraction, should the species become a profuse bloomer.

Viola Lutea. The above-named gentlemen have favoured us with a specimen of their new yellow Viola; it is a very pretty species, with pale yellow flowers, having minute pencillings of purple on the lower petal; the habit is neat and good.

Culture of the Celery. Sow the seed in the first week in February, and when the plants are large enough, prick them out in garden soil rich in vegetable matter, under hand glasses. Prepare the trenches in the usual manner in the first week in June, by excavating them nine inches deep, and digging in a good dressing of the spent dung of an old mushroom bed. Plant out strong plants with good balls, and give a good watering. When the plants have been established about a month, add a little earth to them, but be careful it does not get into the hearts, previous to which give each row a good soaking of weak liquid manure or soot-water, a day or two before the operation is performed; if worms or other insects are found troublesome, scatter a little dry soot along the rows. In gardens where the subsoil is dry, give good soakings of water, at least once a fortnight, in preference to dribbling in small quantities daily. Very rich dung is not good for celery, and strong manure-water should also be avoided, but a compost of turfy loam, peat, and leaf-mould, or thoroughly decomposed cow-dung, in equal quantities, is a good preparation. Place the plants eighteen inches apart in the rows, and keep the soil constantly stirred.—*W. Cole* in *Journ. Hort. Soc.*, iv., 55.

Mr. Saul's Improved Flower-Pot and Potting-Bench. The pot has a moveable bottom, with a rim round it, and on the under-edge of the top there is also a moveable zinc rim about an inch broad, fixed with three small pieces of lead, at right angles to each other; which are soldered on the top side of the zinc, and easily bend over the top-edge of the pot, so that it is readily fixed, and removed from one pot to another. The slugs will not pass over this zinc rim; therefore the plants and flowers are secured, whether they are growing in pots or in the borders. The pots are made of different sizes, the same as any other kind. On the top of the potting bench there are two sliding springs, so arranged as to suit any sized pots, by means of two thumb-screws on the under side of the bench, so that the pot slides easily under the ends of the springs, and is then held firmly by means of the pot rim; the foot being applied to the lever, the plant and ball of earth are raised, as shown in the drawing, and the operator has both his hands at liberty to perform his work.—*M. Saul, Nuteby Cottage, Garstang.*



Treatment of Nepenthes. The most suitable situation for the different species is an orchid-house, in which air and moisture are well regulated, and where the temperature ranges from 55° to 60° at night, for they always suffer from stagnant moisture, and especially when the temperature is allowed to become low. They flourish in a warm, moist atmosphere, if it be kept constantly but slowly in motion, and entirely free from sudden changes or strong currents of cold air. If, however, they are placed next the entrance to the house, where there is a fresh supply of air put in circulation every time the door is opened, they will flourish better than if placed in a more confined part, where the air and moisture is less disturbed; they also like a good supply of heat and moisture to their roots. *Pot,* in an equal mixture of sphagnum, chopped very small, and the fresh fibre of rough peat, entirely freed from the finer particles; well drain the pots, and press the material well down; plunge the pots in moss, with a bottom heat of 70° or 80°, and keep a very moist atmosphere; also water the moss well, continually, in which the plants are plunged. *Propagate* by cuttings, layers, and seeds. *Cuttings* are made of the young shoots or offsets produced from the base of the old stem, when they have become a few inches long. Pot these singly in rather large pots, well drained and filled as above; plunge them in damp moss in a bottom heat of 80°, and cover with a bell-glass. When *layers* are used, they are taken off in the usual way, and are planted in the same manner as cuttings. *Seeds* offer the best mode of increasing them when they can be obtained; they should be sown as soon as they are ripe, in pans half filled with broken potsherds, over which a layer of rough sphagnum should be placed, and above that, three inches of the same material chopped quite small; the whole should be surfaced with a little fine peat soil, upon which the seeds should be sown, without covering them; the pots should afterwards be plunged in moss in a bottom heat of 80°, and closely covered with a bell-glass. When the plants are large enough, shift them into single pots, filled with the same materials as for sowing the seeds; keep them close and moist until they have recovered from their shift. When the roots are established, cautiously expose to the atmosphere of the house, but let them have a good bottom heat. When well-established, replace in large pots or boxes, so that there will be no necessity to shift again for some years.—*G. Gordon* in *Gard. Chronicle*, Jan. 6th, 1849, p. 5.

Transplanting Large Evergreen Trees and Shrubs. Large hollies, yews, cedars, and similar ornamental evergreens, intended for immediate effect, should have their roots pruned any time before they begin to grow. In some instances it will be better to dig a trench within a reasonable distance from the bole of the tree, so as to retain a ball no larger than can be transplanted. This trench should be cut sufficiently deep all round the tree, and as much under it as may appear necessary, to get at the principal roots, which should be cut through, and the soil again filled in. The wounds will be completely healed by the autumn, and numerous rootlets sent out into the loose soil. The plant will be checked in its growth, and may probably become a little discoloured if it has previously been in a vigorous state of growth. As to the proper season when the operation of transplanting should be conducted, the winter months, or from the end of October to the beginning of April, is the usual time recommended for planting; but for large plants, from six to thirty feet in height, the best time is early in the autumn, when the young shoots begin to attain a certain degree of consistency; then the operations ought to be conducted with all possible expedition. The end of August is a good time to begin, September being the safest month in the year—selecting such plants to commence with as have matured their shoots. Another and a very important advantage is, that the force of the sun during summer, although now on the decline, has warmed the earth to a considerable degree and depth, so that the mutilated roots are comparatively situated on a bottom heat, which rapidly promotes cicatrisation, and frequently aids the emission of young spongelets during the current autumn. The exact period to commence these operations must however always be determined by the nature of the season, and the state of maturity the current year's growth has attained; in some seasons an earlier beginning may be made than others; some kinds of plants also ripen their wood much earlier than others. In hot and dry autumns some of the larger specimens will flag and droop. To guard against injury from this, water the roots well at planting, with pond water; and plants of rarity may be occasionally syringed in the evening for a time after being planted. This, however, will not be required if the weather be moist or cloudy. The plants must then be securely staked, and ultimate success is certain.—*R. Glendinning, F.H.S.*, in *Journ. Hort. Soc.*, iv., 41.

Treatment of Ipomœa Ficifolia. This species flowers in the conservatory from June to December, and is neither sparing in the number of its blossoms, nor too rampant in its growth. Strike cuttings in the early part of the previous season to that in which they are required to flower; shift them into three-inch pots, and grow them in the cutting frame. When the pots are filled with roots, the plants are again shifted into six-inch pots, using light sandy soil on both occasions; place them on the front shelf of a cool stove in which the thermometer frequently falls as low as 40° during the early part of the winter. In the beginning of February shift them into twelve-inch bottomless pots, using rough peat and yellow loam in equal quantities, together with a small quantity of rotten leaf-mould and silver-sand; place them again in the stove and increase the heat as the season advances. Attach a piece of strong cord to the pots and continue it to the roof immediately under the glass, fix it to the back wall, and train the shoots to it as they grow. Early in June take them to the conservatory, plunge the pots to the rim in the border, suspend brass chains from the roof over the plants, and to these attach the cords of the plants. The shoots will run up the chains, and thus a column of rich purple blossoms is formed from each plant. —*James Duncan* in *Journ. Hort. Soc.*, iv., 61.

—Culture of Lælias. The flowers of *Lœlia majalis* will remain in perfection four or five weeks, if kept in the shade. The plant dislikes a strong and close heat; about 70° is sufficient even during the time of its most vigorous growth. It should be hung up where it can receive a little air daily; during rest it should be kept quite cool, and receive but little water, with a temperature of from 50° to 60°. During the period of growth water well both root and top, and keep the atmosphere moist. When in flower dispense with syringing, and give a heat ranging from 60° to 70°. Do not expose it to much cold at any stage of its existence, or it will at once show signs of suffering. It succeeds in an open, rough, wooden basket, filled with sphagnum and potsherds; it also grows freely on a block with a little sphagnum on it.

Lœlia anceps remains in blossom four weeks, the spikes grow from three to four feet long, and the plant should be treated exactly as *L. majalis*, as should also *autumnalis, acuminata, albida,* and *superbiens*. *L. cinnabarina* and *flava* should be grown in pots half filled with potsherds, over which is placed an inch of Sphagnum Moss; then fill the pots with peat in pieces as big as a hen's egg, mixing them with potsherds. The less water given during the season of rest the stronger will be the growth, and the more freely the plants will flower. Plants on logs without moss require more water than those in pots or baskets. Water twice a day during sunny weather, when the plants are growing freely. When very dry, take the log down, and dip it in water over head. Rain or pond water is the best to water with, and it must be nearly as warm as the air of the house in which the plants are kept. The temperature should be the same as for *L. majalis*.—*B. S. Williams* in *Gard. Chronicle*, Jan. 6th, 1849, p. 6.

Esculent Vegetables in Borneo. The heat and moisture of Borneo are too great for European fruits and vegetables in general; but *French beans, cucumbers, endive, tomatos,* and *asparagus,* succeed tolerably. The Chinese, in Sarawak, have several gardens of native esculents near the town. The egg-plant there yields an excellent fruit; and a large radish is much prized, which, when boiled, tastes like a turnip. *Sweet potatoes, yams, earth-nuts* (Arachis hypogæa), and various kinds of *pulse, cucumbers,* and *pot-herbs,* are grown for the use of Europeans; also sugar-cane and pine-apples for the Malays, who are averse to the trouble of cultivating these esculents for themselves. Some kinds of *fern* afford an excellent vegetable in the unopened fronds, which are boiled, and preferred by foreigners to most of the productions of the island, except the cabbages of the various *palms.* Though several sorts of fern are eaten, the *Marattia,* which grows plentifully on river sides, is preferred. Of all esculent vegetables, however, the heart or cabbage of the palm, called *Nibong,* is the most esteemed. It consists of the whole unexpanded foliage, and is delicately white, with a very sweet nutty flavour. It excels the cabbage of the cocoa-nut palm, but is inferior to that of the *Pinang* or *Areca,* which, however, on account of the value of the tree, is very seldom used; the extraction of this edible part causing, invariably, the destruction of the entire tree. The *Nibong Palms* are very plentiful near the mouths of all the rivers, and are prized also for house-building, &c.—*Low's Borneo* in *Bot. Mag.*, 74 Mis., p. 17.

CALENDAR OF OPERATIONS FOR FEBRUARY.

The weather is now very open and mild; and should this continue, the business of preparing ground for sowing seeds, and many other things may be conducted with rapidity.

FRUIT AND VEGETABLE DEPARTMENT.

Under Glass.

Cherry Trees planted in pots or tubs which are intended to be forced, should be placed in a gentle heat early in the month. The treatment is very similar to that of Peaches, only Cherries produce better when subjected to a higher temperature than Peaches will admit of. Give also abundance of light and a rather humid atmosphere.

Cucumbers and Melons. To grow Cucumbers to perfection during the winter and early spring, there is no system like having a house or pit heated with hot-water pipes, with the plants growing in tanked beds. *Melons* do extremely well in this way. If grown in pits and frames, earth up as the growth of the roots require it, and cover well at nights to prevent injury from cold.

Figs, in pots or tubs, in progress of forcing, must be liberally supplied with water at their roots, and also with a little thin liquid manure once or twice a week.

Kidney Beans may still be planted in pots, and placed in the forcing-house for a successive crop.

Mushrooms.—Make new beds as soon as the old ones are beginning to show signs of bearing; be attentive to ventilation, temperature, and humidity.

Peach-House. As the season advances, and light increases, the heat of this structure may also be raised in proportion.

Pineries. The temperature of these structures must not be allowed to range high during this month; but as the heat from the sun becomes stronger, let the temperature be regulated accordingly. Be systematic in watering, and air, and keeping secure from frost or excessive cold. They do much better if planted out in beds of light soil, or peat earth, heated by hot-water pipes.

Potatoes planted in leaf-beds, and covered with frames, so as to be completely screened from frosts, will succeed those which are now earthed up, and will just precede the earliest crops out of doors. It is always where glass is an object, advisable to sow a few radishes, which will all be drawn before the potato-tops arrive at much size.

Strawberries. A large supply of these in pots, may now be introduced into a moderate heat. They require abundance of light and air. Keene's Seedling may be considered amongst the very best for forcing.

Vineries. The Grapes set last month, will require thinning, and occasional syringing. Attend to temperature, ventilation, stopping, and tying in.

Open Air.

Apricots and Peaches will at the end of the month begin to swell their buds. In pruning, always secure a good supply of young wood from the bottom.

Grafting fruit trees should be done early in the month.

Pruning and Nailing should be forwarded with all speed.

Peas and Beans may be sown twice in the month; also sow a few in boxes, and place in the Vinery or Peach-house.

Radishes and Lettuce. Sow twice towards the end of the month in warm situations.

Spinach. Sow some round-seeded at the end to succeed the winter crop.

FLOWER DEPARTMENT.

Glass.

Conservatory and Greenhouse. Give a general dressing to all the climbers in the beginning of the month. Keep up a supply of flowering-plants, so as to keep these departments gay and cheerful. Give increased root room to such plants as require re-potting. Also top-dress others as they may stand in need.

Frames and Pits filled with young stock for the flower-garden in summer, must be securely covered from the effects of severe weather, and have as much light and air as the season will afford. And great care is requisite not to over-water them.

Orchid-Houses may receive a gradual increase of temperature as the season advances, and give a proportionate increase of atmospheric moisture. Give also a free ventilation whenever the weather will permit.

Stove-Plants are for the most part still at rest; but the various kinds of *Achimenes*, *Gloxinias*, and *Gesneras*, should all be re-potted and started in a moderate heat into growth. Creepers of various kinds should also be re-potted—as *Ipomœas*, *Echites*, *Stephanotis*, *Pergularia*, &c.

Open Air.

Alterations should be progressed with; Shrubbery borders dug; Compost for flower-beds prepared; Roses pruned, and Evergreens planted, and everything else that the weather will permit to be done.

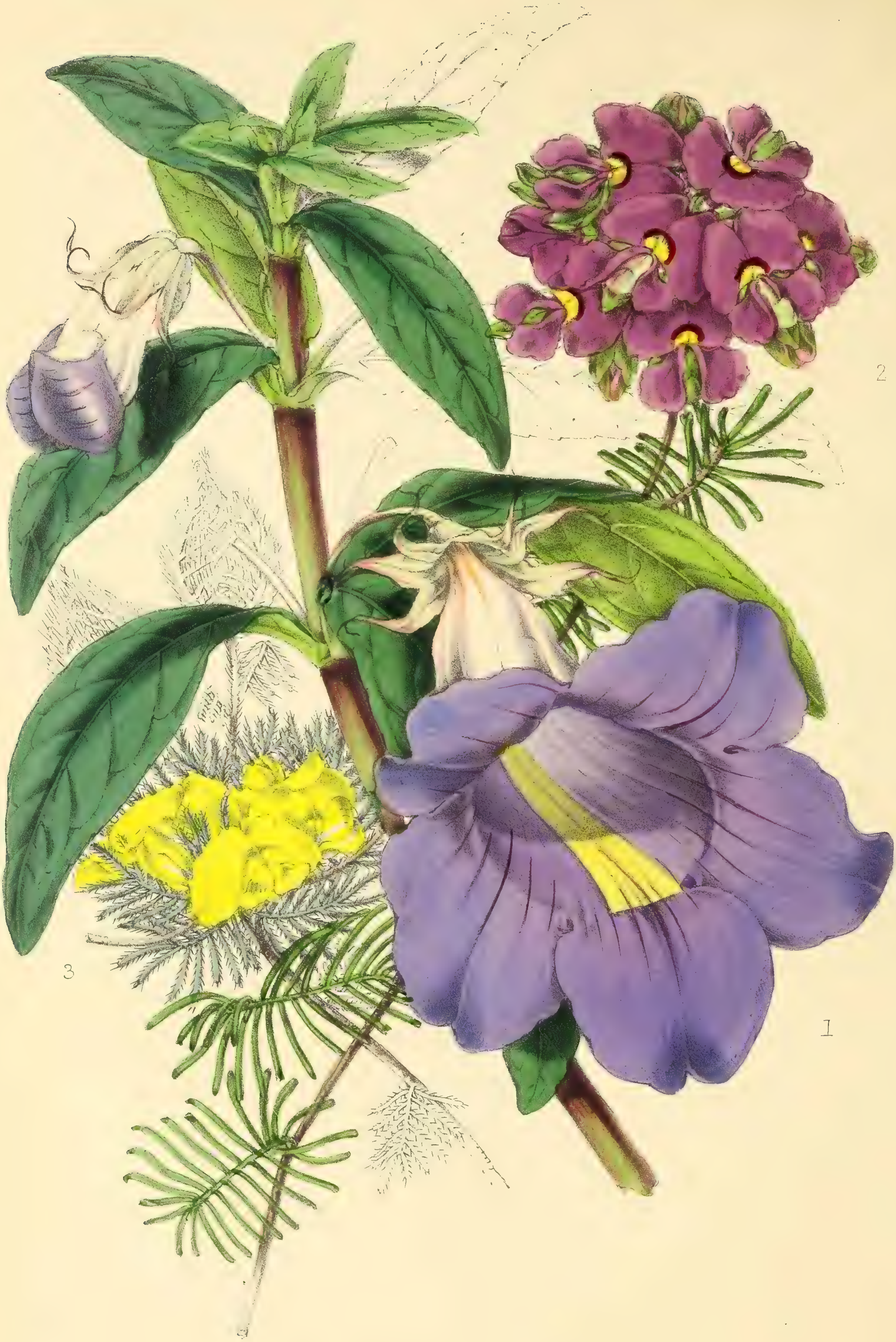
FOREST DEPARTMENT.

Felling Timber for naval and other purposes, where durability is required, should be completed early in the month.

Thinning and Pruning should also be proceeded with as soon as possible, that the plantations may be cleared of spray before growth commences.

Planting should be finished at latest by the end of the month if possible, and the weather will admit of it.

Nursery. About the end of the month many of the seeds of forest trees may be sown if the weather is open; taking up trees, digging, pruning, and many other operations will suggest themselves to assist in rendering all neat and orderly.



S. Holden, del. & Lith.

Chirita Moonii?

2. Gompholobium venustum. 3. Gompholobium hirsutum.

PAXTON'S

MAGAZINE OF GARDENING AND BOTANY.

CHIRITA MOONII. (Mr. Moon's Chirita.)

Class, Didynamia.——*Order,* Angiospermia.——*Nat. Order,* Gesneriaceæ.——(*Veg. King.*)

Generic Character.—*Calyx* tubular, pentagonal, valvate. *Corolla* monopetalous, tubular, campanulate, ventricose beneath; *limb* bilabiate, five-lobed, lobes rounded. *Stamens* five, two fertile, and three smaller ones abortive. *Anthers* cohering, kidney-shaped, naked, one-celled. *Ovary* a silique. *Style* one. *Stigma* bipartite, lobes oblong, and spreading. *Capsule* two-celled.

Specific Character.—*Plant* a stove shrub, two or three feet high. *Stem* simple, or slightly branched. *Branches* obscurely angular, and thinly covered with adpressed hairs. *Leaves* opposite, occasionally whorled, ovate-lanceolate, feather-nerved, downy, especially beneath. *Leaf-stalks* nearly an inch long. *Peduncles* more than two inches long, axillary, two or three together, sometimes solitary, single-flowered, with two small narrow bracts. *Flowers* large, showy, deep purple. *Calyx* large, yellowish-green shaded with brown, divided into five narrow, lanceolate, acute sepals, downy. *Corolla : tube* ventricose, curved upwards, rather bell-shaped, with a wide mouth, and a broad yellow line on the lower side; *limb* two-lipped, spreading, consisting mostly of five rounded lobes, deep purple on the upper side, and paler beneath and on the outside of the tube.

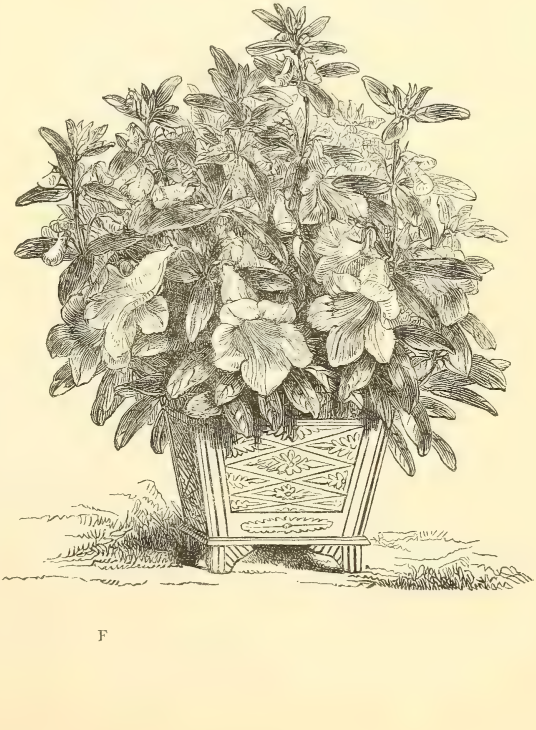
Authorities and Synonymes.—Martynia lanceolata, *Moon* in *Cat. Ceylon, Pl.* p. 45. Chirata, *Don. Prod. Flor. Nep.*, 89. Calosacme, *Wallich.* Didymocarpus, *Wall.* Chirita, *Hamilt.* Chirita Moonii, *Gardner, Hooker* in *Bot. Mag.*, 4405.

This fine species is a native of Ceylon, where it was originally discovered by Mr. Moon, at the "Four Korles," and was inserted in the Catalogue of Ceylon, under the name of *Martynia lanceolata.* Its flowers are of the richest purple, much larger than those of a Gloxinia, and are produced in succession throughout the whole of the summer. It has been subsequently found by Mr. George Gardner, amongst rocks near the summit of the Hantane range, and has by him been placed under the genus *Chirita.*

The plant thrives in a moist and moderate stove, potted in a light and rich soil similar to that used for members of the genus Gesnera, Gloxinia, and other similarly habited plants; and is increased by cuttings.

Our drawing was prepared from a specimen which flowered in the Royal Botanic Gardens, Kew, in July, 1847, and which was exhibited at the Society's Garden.

The generic name *Chirita,* is a slight alteration from the native name of one of the species.



GOMPHOLOBIUM VENUSTUM. (Beautiful Gompholobium.)

Class, DIADELPHIA.——*Order*, DECANDRIA.——*Nat. Order*, FABACEÆ.——(*Veg. King.*)

GENERIC CHARACTER.—*Calyx* five-parted, nearly equal. *Keel* of two concrete petals. *Standard* broad. *Stigma* simple. *Legume* many seeded, nearly spherical, and very blunt.

SPECIFIC CHARACTER.—*Plant* an evergreen shrub, from one to two feet high. *Stem* twining, slender. *Branches* flexuose, long, lax. *Leaves* alternate, pinnated, consisting of ten or twelve pairs; *leaflets* awl-shaped, narrow-linear, rounded at the points, veiny, with revolute margins, smooth. *Petioles* very short. *Flowers* corymbose, rosy-purple. *Peduncles* terminal, many-flowered; *pedicels* slender, furnished with two bracts. *Calyx* smooth, green tinged with purple, ciliated at the margin. *Standard* waved at the margin, large, crimson-purple, with a bright yellow blotch at the base. *Keel* almost elliptical, concave, smooth, shorter than the wings. *Wings* broadly-obovate, waved, spreading, rose colour. *Stamens* ten, free. *Legume* subglobose, glabrous, longer than the calyx.

AUTHORITIES AND SYNONYMES.—Gompholobium venustum, *R. Brown* in *Hort. Kew. Hooker* in *Bot. Mag.*, 4258.

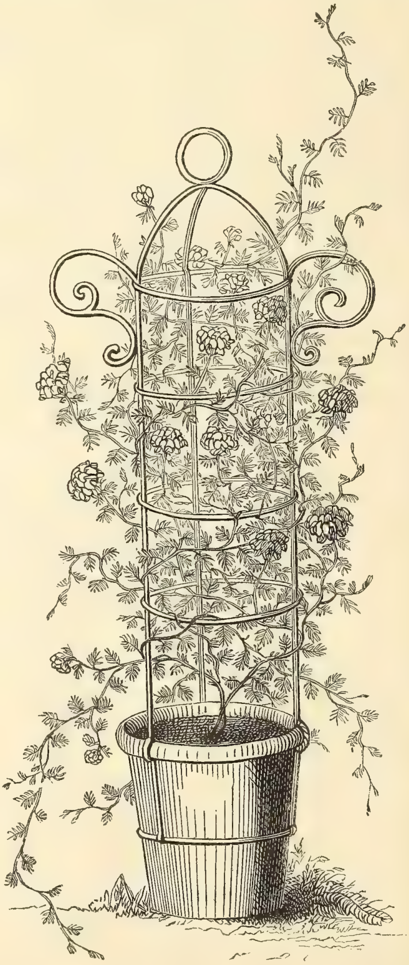
MORE than thirty species of Gompholobium have been discovered and described by botanists as growing in various parts of Australia; the whole have been introduced to our collections during the present century. All are dwarf shrubs of slender habit, and vary in height from six inches to three feet. The flowers of the greater part are yellow, tinted with various shades of red; a few, however, are purple, of which our present subject is one.

All the Gompholobiums are elegant plants, and deserve to be cultivated; but the more slender kinds are generally considered difficult to manage well, as they very often suddenly die without any apparent cause; the fact is, the roots are very tender, and if the soil in which the plants grow ever becomes parched by drought, or saturated by water, sudden death is almost sure to follow.

G. venustum is a most lovely plant. Messrs. Knight and Perry received seeds of it from Mr. Drummond, who found it growing at the Swan River Settlements in 1843; it had, however, been previously detected in several localities in South West Australia by Mr. Brown; and also Mr. Frazer gathered it in King George's Sound. It flowered for the first time in this country in July 1845; and our drawing was prepared in the Nursery of Messrs. Knight and Perry, King's Road, Chelsea, in July 1847.

The plant has a slender, twining habit, bright green foliage, fine and wiry; the reddish lilac blossoms are produced abundantly, in clusters of ten or twelve, at the extremities of the branches.

The generic name is derived from *gomphos*, a club, and *lobos*, a pod; in reference to the shape of the pods.



KENNEDYA EXIMIA. (Choice Kennedya.)

Class, Diadelphia.——*Order*, Decandria.——*Nat. Order*, Fabaceæ

Generic Character.—*Calyx* two-lipped, upper lip bidentate, lower lip three-toothed, equal. *Corolla* papilionaceous. *Vexillum* emarginate, recurved, but not bent back from the carina. *Wings* pressed close to the keel. *Stamens* diadelphous. *Stigma* obtuse. *Legume* linear, compressed, transversely many-celled.

Specific Character.—*Plant* an evergreen shrub. *Stem* twining, hairy. *Leaves* trifoliate; *leaflets* ovate-oblong, acuminate, slightly hairy, of a lively green. *Flowers* racemose. *Racemes* axillary. *Peduncles* pilose. *Calyx* green, tinged with reddish-brown, villous. *Standard* bright scarlet, with a yellow blotch near the base in the centre. *Wings* and *keel* scarlet, the latter shorter than either the wings or standard. *Legume* hairy.

Authorities and Synonymes.—Caulinia, *Moench. Supp.* Kennedya *Ventenat*, Kennedya tabacina, *Labill.* Kennedya eximia, *Lindl.*, and of the Nurseries.

This is a very handsome climbing plant, which was raised by Messrs Knight and Perry, from seeds received from Swan River about four years ago, through Mr. Drummond. It flowered for the first time in the nursery of those gentlemen, in May, 1846, when our drawing was prepared.

The name we have adopted was given by Dr. Lindley, but the plant is evidently identical with the *K. tabacina* of Labillardière.

It is a profuse flowerer, and from its twining habit may be made a very gay object; when trained to a trellis, in such a manner that every side becomes exposed to the light, it is then, when in bloom, a mass of brilliant scarlet and gold.

The treatment requisite for this plant is the same as for the other species. A light loamy soil, mixed with an equal quantity of heath mould, and a portion of sand;—frequent potting to prevent the roots ever becoming matted; and good drainage, are the three important requisites.

A dry, airy greenhouse, careful watering, and little fire heat must also never be lost sight of; for dampness, stagnant water and strong fires, are almost certain to prove fatal to it.

Increase is effected by cuttings, which should be taken off from the plant when the wood is half ripe, planted in pots of sand, and placed in a little bottom-heat.

The generic name was given by Ventenat, a French Botanist, in honour of Mr. Kennedy, formerly of the firm of Lee and Kennedy, nurserymen, Hammersmith.

GOMPHOLOBIUM HIRSUTUM. (Hirsute Gompholobium.)

Class, Diadelphia.——*Order*, Decandria.——*Nat. Order*, Fabaceæ.

Generic Character.—See *Gompholobium venustum.*

Specific Character.—*Plant* an evergreen upright growing shrub, covered on every part with fine hairs. *Leaves* alternate, pinnated, consisting of six or eight pairs, glaucous; *leaflets* linear, obtuse, with revolute margins, and fringed with long hairs. *Petioles* short. *Flowers* corymbose, yellow. *Peduncles* terminal, many-flowered. *Calyx* pale green, tomentose. *Standard* large, deep yellow, pale at the base. *Wings* narrow. *Keel* bearded. *Legume* smooth.

This is another fine introduction of Messrs. Knight and Perry, through their collector Mr. Drummond, who discovered it growing in the same locality with *G. venusta*, and sent seeds to this country in 1844. It flowered in June 1847, when our drawing was made.

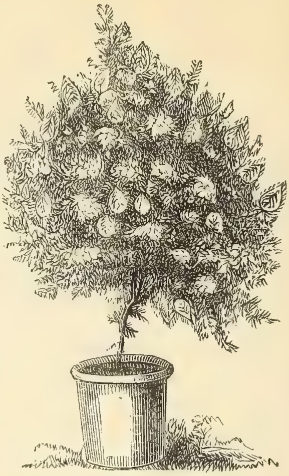
The habit is very like that of *G. venusta*, but the plant is of more robust growth, with less inclination to twine; the foliage is also smaller, very glaucous, and covered with soft white hairs, which also prevail over the whole of the plant, hence the name *hirsuta*.

In its general character it approximates *G. tomentosum* of Labillardière, but differs in several particulars, and when grown well and covered with its yellow bloom, it is not easy, from the peculiar brightness of the colour, to find a more beautiful object for the greenhouse.

For success in cultivating Gompholobiums, proper potting, good drainage, suitable soil, dry air and judicious watering, are of the greatest importance.

For a compost, the usual admixture of equal parts of sandy heath-mould, and light loam, with a portion of silver sand, is the most suitable. Give abundance of drainage with broken crocks or freestone, and do not place the plants deep in the pots, or allow the latter to be of too large dimensions.

It is increased by cuttings, which should not be taken off until after the plant has shed its flowers, and these must not be made from the extremities of the shoots, which are too tender to endure actual contact with the soil; but from those parts which have become half-ripe, and with sufficient firmness to resist the effects of the separation. These should be planted in sharp silver sand, and placed in a gentle bottom-heat, covered with a glass.



Sometimes seeds are produced which should be sown shortly after being gathered; these form strong plants in a shorter time than from cuttings.

ABRONIA UMBELLATA. (Umbelled Abronia.)

Class, Pentandria.——*Order*, Monogynia.——*Nat. Order*, Nyctaginaceæ.—— (Nyctagos, *Veg. King.*)

Generic Character.—*Sepals* united into a tube, which is contracted in the middle: *limb* divided into five spreading, deciduous, cordate segments. *Stamens* five, hypogynous. *Anthers* two-celled. *Ovary* superior, with a single erect ovule. *Style* one, terminal. *Stigma* one.

Specific Character.—*Plant* a half shrubby perennial, with the habit of a Verbena. *Stems* creeping, glutinous, covered with soft hairs, rooting at the joints. *Leaves* opposite, ovate, obtuse, succulent, hairy, and glutinous, like the stems. *Petals* long, hairy. *Flowers* in close umbels, fragrant. *Peduncles* axillary, three inches long, hairy, glutinous. *Tube* of flower pale violet; *limb* regularly five-cleft, lobes spreading, two-parted, purplish rose-colour.

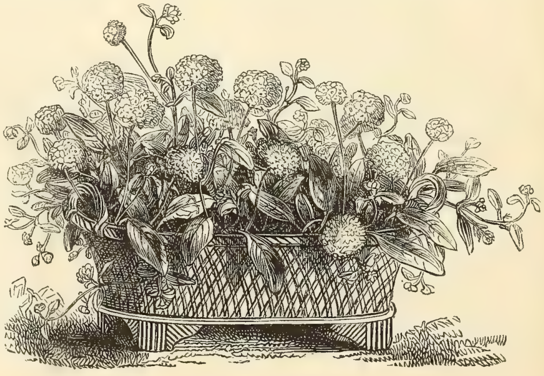
Authorities and Synonymes.—Tricratus admirabilis, *Herit.* Abronia, *Juss.* Abronia umbellata, *Lam. Ill.* i. 469. *Lindl.* in *Journ. Hort. Soc.* iv. 81.

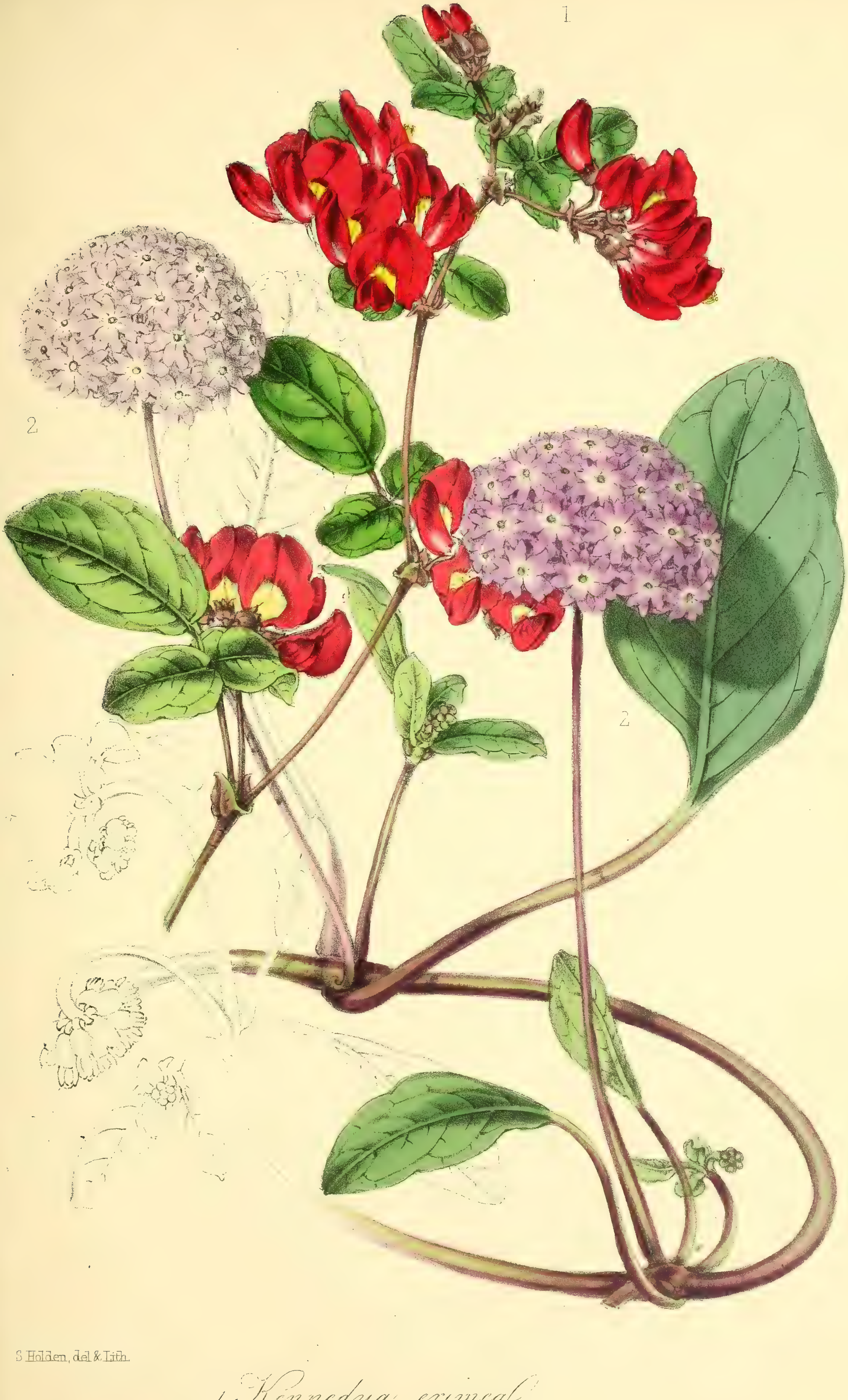
A singularly pretty twining plant, raised from seeds sent from California to the Horticultural Society, in 1848, by their collector, Mr. Hartweg, who discovered it near the sea-shore in Monterey.

It grows naturally in loose sand, creeping upon the ground, and emitting numerous roots from its prostrate stems, which being glutinous are often covered with the glittering particles of the material in which the plant grows.

Its flowers are produced in great abundance from June to October, are of a lively colour, very pretty, and emit a delicious fragrance, especially in the evening.

It is certainly a good species for either bedding out in the flower-garden during the summer, or growing in a pot and training to a trellis. The plant from which our drawing was made in September,





S Holden, del & Lith.

1 Kennedya eximea

2 Abronia umbellata

1848, bloomed in the Gardens of the Horticultural Society, and was grown in a shallow pan twelve or fourteen inches in diameter; the stem was wound round on the top of the soil, so that the foliage covered the surface of the pot evenly. The flower-stems grow three inches or more high.

The plant is about as hardy as a Verbena, and should be treated in exactly the same manner, and increase is effected both by cuttings and seeds.

The generic name is derived from *abros*, delicate, in allusion to the delicacy of the involucrum.

THE TEMPERATURE OF PLANTS, AND OF THE GROUND.

By John Towers, Esq.

About the years 1824 to 1828, some very interesting researches were made, on the first of these subjects, in Germany, and in the Botanic Garden of Geneva, and the results communicated to one of the German universities. M. Halder, in 1826, had stated that some trees, during severe winters, are at a lower temperature than 32°, or the freezing point of Fahrenheit's thermometer. The winters of the German continent are usually very severe; and this fact may, therefore, be readily admitted; as may also that of the watery sap being in a state of congelation without danger of vital injury. We were further told that the winter of 1828 being severe, the temperature of a poplar was observed during that year, and the following notices recorded:—The temperature of the air and of the tree were nearly equal in February; that of the tree became higher in March, April, and May; but the temperature of the air was higher during the other months of the year.

If we retrace the extreme degree of cold which was witnessed in England in 1838, 1841, and 1844, when on several occasions the mercury receded below zero, it will not be difficult to believe that the sap of trees and shrubs would be reduced so as to become far below 32° of Fahrenheit: it is also familiar to the recollection of every gardener, that plants in cold frames are frequently so frozen, that the soil of the pots becomes a solid and immovable mass. If vital action be strong, its *principle* is found sufficient to protect the tissues of the hard-wooded tribes; but in other cases wherein the tissues are lax and watery, a disruption of the cellular membrane leads to the inevitable destruction of the plant, and then it becomes subjected at once to chemical decomposition. To return from this digression. We are told that at the beginning of January, 1828, the poplar gave a temperature higher by 10° than that of the external air, which excess the writer assigned to a great disengagement of heat when the aqueous juices of the tree congealed; but, he adds, "when it thawed, the heat of the tree was 4° and even 8° above that of the air." The observations made during two successive winters have shown that the thermometer, in the interior of trees, may descend below zero without injury to vegetation. On the 26th of January, 1828, the thermometer marked $1\frac{1}{2}$ plus Fahrenheit; on the 27th, it rose to $34\frac{1}{2}$; the change in the tree was less sudden, since on the second of those days it remained at 32°, the exact freezing point.

Several trees were cut, and they were found frozen to a certain depth. The *Æsculus Hippocastanum* was frozen $8\frac{2}{10}$ lines; *Fraxinus excelsior*, $12\frac{1}{2}$ lines; *Salix fragilis*, 17 lines. The water of a pool close at hand, was frozen at the same time to the depth of $8\frac{8}{10}$ inches. It appeared that the frost had penetrated just in proportion as the trees contained more or less water; and this circumstance will partly account for the rapid and total destruction of Pelargoniums and other juicy shrubs which remain in the open ground after bedding out in parterres, &c. The writer alluded to, observes that at the beginning of April "nearly all trees contain eight per cent more of aqueous fluid than at the end of January." Hence, he concludes, that to this cause must be assigned that more general loss of shrubs which takes place in the early spring, than in the depth of winter.

The foregoing passages contain the substance of the interesting article alluded to; but they are not verbatim extracts.

In England the amateur complains of his losses in February, before the drying winds of March come on. Our country is damp, and air cannot be admitted into pits and frames during haze and soaking mists; and it is an undoubted fact, that cold dry air, even with several degrees of actual frost, does little injury even to succulent plants, provided they be so far defended as merely to guard against the destruction of their cellular tissue.

The attempt to ascertain the internal temperature of trees or shrubs at any time of the year, must be attended with great difficulty; its results also, will be, at best, uncertain and ambiguous. At all events, so long as the vital principle shall remain intact, the plant will be secure. The temperature of the ground, however, must be brought under consideration, inasmuch as it cannot fail to perform an important role in the mutual intercourse that exists between the fluids of the plant, and those of the medium in which its roots are established. The vast influence of electro-magnetism, also, should not be overlooked in conjunction with the heat developed by the disturbance induced during the decomposition of moist vegetable substances. Solar power, so far as light and heat are concerned, acts directly upon exposed surfaces, and the effects of both the rays are determinable by the senses, but they cannot penetrate to any great depth: to *Electricity*, that all-pervading, everywhere present agent, we must refer those chemical analyses which are induced far below the common surface. Chemical energy indicates the presence of Electricity; they appear to act reciprocally. Vitality is directly opposed to the decomposing power of either; but from the moment that the vital principle is extinguished, the electro-chemical forces come into play, and the results which follow are the progressive development of what are erroneously called the *elements* of the defunct organic body. In the case of vegetables these pseudo-elements comprise three—sometimes four—gaseous aerial fluids, familiarly known as oxygen, hydrogen, carbonic acid, and perhaps nitrogen; terms, which it will be an object to render intelligible in future communications.

Whatever uncertainty may exist as to the actuating causes of variation in the temperature of living plants, there can be none concerning the deteriorating effects of stagnant and superfluous water in the land. These and their causes are traceable, and thus we arrive at unerring conclusions on the importance of thorough draining.

" If," observed Mr. Parkes, in his valuable paper, at page 119, *et. seq.*, vol. v. of the " Royal Agricultural Journal."—" If a soil be saturated with water the noblest classes of plants cannot flourish; they vegetate more or less imperfectly, until the quantity of water be so diminished as to suit their habits. The reduction of the excess to the due proportion can only be effected naturally, by its gradual evaporation, i.e. by its conversion to vapour; and this transition would require the absorption of a quantity of heat, so enormous, as to startle any one who has only taken a superficial glance at the process of vaporisation."

To convert a quantity of water, say one pound, to steam—would require about six times as much heat as would raise its temperature from 50° to 212°, that is, to the ordinary boiling point. But steam passing from *open* vessels can never be made to exhibit a higher degree of heat than that of the boiling water from which it exhales. How then can it be made to appear that, intrinsically, it contains more heat than the boiling water from which it escapes? The question can be solved by three processes. The first and simplest is that of *condensation*, whereby the steam from water boiled in a common *still* produces *distilled water*—a pure liquid, of very great value to the practical chemist. By it also, we obtain a convincing proof that a very small quantity of fluid can be condensed from a volume of steam many hundred times greater than that of the water operated upon, and reproduced in the receivers. Second, by passing the steam of boiling water into a given bulk of cold water, when it will be found that one pound of steam will raise about six pounds of water from 50° to 212°.

The converse experiment of dissolving one pound of pounded ice at 32°, in a known weight of boiling water, must prove eminently instructive, as it will show the immense quantity of heat that the ice will absorb. But *why*, or how should steam at 212° operate such marvellous effects? Is each individual particle the vehicle of six times its own apparent sensible heat? Or is that agent, which, *pro tempore*, repels and keeps asunder those particles, the recipient of the surplus heat; and if so, what is that etherial repellant element? Let the philosopher reply.

"Water is vaporisable at *all* temperatures. Its expulsion from the earth does, even under certain circumstances, continue when the atmosphere is replete with moisture; and it is most important to observe that, however low a temperature the water in the soil or that of the atmosphere incumbent on it may be, at which vapour is formed and expelled, the same amount of heat is carried off *by a given weight* of vapour, as if it had been generated in the open vessel over the fire, or in the close boiler of a high-pressure steam-engine." Here, before I proceed further on Mr. Parkes' authority, it may be interesting to notice the fact, that the *vapour* which impetuously rushes from the safety-valve of the said engine, imparts no sensation of heat to the hand, held at a few inches above it; and indeed so long as the vapour shall remain invisible, and not condensed into visible steam. On the contrary, the feeling produced is rather that of a cool, forcible stream. But if the hand were raised above the invisible vapour, the flesh would be intensely scalded in a second of time. Vaporisation is attended with much electricity, and by that, perhaps, the watery particles are so repelled and reduced in size, as to become perfectly invisible, under which circumstances, the cool freshness of the electric stream alone is felt, for *heat* that cannot be, which produces cold.

"It has been ascertained that it requires two or three ounces of coal to convert one pound of water into vapour; therefore it is evident that an enormous quantity of heat must be taken from the soil in cases where water is allowed to remain stagnant until it evaporates."

Parkes estimates the quantity of rain which may fall upon an acre in the course of one year, at thirty inches in perpendicular depth, or in volume, at 108,900 cubic feet, a sum which, divided by 365, will give 298 cubic feet—18,047lbs. per day! This weight of water, he says, would require for its diurnal evaporation, supposing it could be so carried off—the combustion of 24 cwt. of coals, or 1 *cwt. per hour per acre* throughout the year! Now, admitting the correctness of the above statement, we may imagine the vast depression of temperature which the earth must sustain if the excess of water over and above the due quantity required for vegetation, be carried off as vapour, at the expense of the heat, or of its agents, existing within the body of the soil!

Excess of moisture obstructs the absorption of heat by the solid matters of the ground, since it is proved by actual experiment that stagnant and quiescent water conducts little or no heat from the surface downwards. A very satisfactory article on this subject appeared in the *Gardeners' Chronicle* of January 20th, with an appropriate figure, by which it was shown that a thermometer fixed horizontally at the bottom of a deep glass cylinder, previously filled, within an inch or two of the brim, with cold water, would not indicate any increase of temperature, when the remaining space was filled with boiling water, so cautiously added as not to create any disturbance in the body of the fluid. On the contrary, if a mass of water be heated from below, as it is in many familiar operations, the temperature of the whole acquires an equable temperature. The lower heated particles rise rapidly, their place being supplied by the colder and heavier particles which descend; and thus a circulating motion is created, and increases, till the whole volume attains the boiling point.

(*To be continued.*)

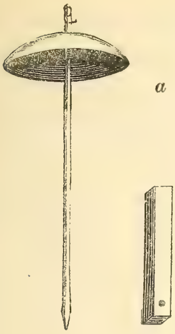
ON THE CULTURE OF THE AURICULA.

By Mr. Dickson.

The Auricula is a native of Austria, Switzerland, Syria, and the lofty Caucasus. It was introduced about the year 1596, and has been long prized by florists. The name, *Primula Auricula*, is derived from *primus*, first, in allusion to its early flowering, and *auricula*, from *auris*, an ear, from the resemblance of the leaf to an animal's ear.

It is now too late in the season to begin from the first with the cultivation of the Auricula; yet as many amateurs may already have in possession a collection of these plants, it may be useful to furnish the particulars for successful management.

Any time from the beginning to the end of February the plants must be top-dressed. This business is performed as follows:—remove the plants to a convenient place, and turn each out of its pot with the ball entire, that you may be certain the drainage is good, and the soil free from worms; remove about an inch of the surface mould from around the neck of the plant, and replace it in the pot; loosen the soil betwixt the fibres with a thin pointed stick to about half an inch deep, and remove every offset likely to impoverish the mother plant. In this last operation always use a sharp knife, as by tearing off the offsets, a wound is sometimes made, which proves fatal to the plant; some are more susceptible of injury in this respect than others, of which the variety known as Lee's Col. Taylor may be adduced as proof. Having thus far proceeded, fill round the neck of the plant with prepared compost, which should consist of two-parts sheep manure, in a very decomposed state, one-part rich turfy loam, and one-part decayed leaf-mould, just coloured with silver sand; the stems of show plants should be buried rather low in the soil; strike the pot steadily to settle the earth, and the operation is complete. Now proceed with potting the offsets;—the compost best suited for these must be formed of one-part loam, one-part peat, and one-part leaf-mould, coloured as before with silver sand. In potting offsets it is well to divide them, placing the stronger kinds in single sixty-sized pots, the others five or six in a pot, placed round the rim. Water them with a fine rose watering-pot, and place them in a situation where they can have the advantage of the morning sun. Strong rooted plants may be put in small frames, and kept about four inches from the glass, but the weaker ones, and those that are not rooted, strike best under hand-glasses; give air for an hour or two in the morning, by drawing the lights off the frames; if the weather is cold, replace them. In warm weather the lights may be tilted about an inch at the back, and the plants shaded with canvas from the rays of the sun. The hand-glasses will require lifting only once in three days for an hour; shade the same as in frames. To bloom these flowers in perfection is the next consideration. The proper time to remove the plants from the frames to their blooming glasses is when the trusses are formed, and the pips about the size of peas; then place the pots on a bed of coal-ashes, keeping the early and late kinds under separate glasses, as they will require a different course of treatment. These points of information are essential to the cultivator, as some varieties can be kept back for exhibition, whilst others must be caught to the day. Oliver's Lovely Ann, Lee's Colonel Taylor, Page's Champion, Fletcher's Ne Plus Ultra, and Waterhouse's Conqueror of Europe, will remain in perfection for a week or ten days after the bloom is fully expanded, whilst Stretche's Emperor Alexander, Taylor's Glory, Netherwood's Othello, and a few others, will not last above a day or two after they are in bloom. The plants should be placed on a kind of stage, erected for the purpose, about eighteen inches from the ground; a northern aspect is the best for the purpose. Warmth is indispensable to the production of fine blooms, and care must be taken that they are not checked in their progress towards expansion; should they be so, exhibition must be abandoned for that season. This portion of the management involves some little difficulty, but there are few persons who have not felt themselves well repaid when witnessing the effects produced on their plants by such means. While the pips are swelling, both rain and sun are beneficial, although the pips themselves must not be exposed to either,—as the rain might cause the colours to run, and the sun would render them faded and dull in colour; consequently some slight protection in the way of shade must be afforded to them. Many contrivances for this purpose have been put in requisition, such as small glasses, paper caps, (fig. *a.*) square pieces of wood, &c. (fig. *b.*) but I think hand-glasses, capable of holding nine pots, can be managed with less trouble, and a greater regard for appearance. An hour's morning sun will give additional brilliancy to the colours; at all other times after they begin to expand they must be carefully shaded. After the blooming season is over, I will again resume this subject.



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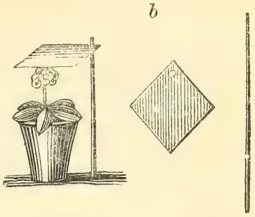

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With regard to sowing the seeds of Auricula, I may just say, that the present month is full late for the purpose, but those cultivators who may have delayed the business, should lose no further time. The seed may be sown either in pans or pots; the compost best suited for the purpose, is one part turfy loam, one part peat earth, one part leaf mould, one part horse manure rotted into mould, with a little silver sand. Let this be well prepared, and passed through a tolerably fine sieve; see that your pots have good drainage, by means of broken crocks placed at the bottom; fill them with the compost to the level of the rim; give the pot a firm shake on a bench, to settle the soil, which should sink below the rim half an inch; then sow the seed regularly over the surface, and press it gently down; to cover it with soil is not necessary; moisten it lightly, from the spray of a soft brush dipped in water; place the pots in a southern aspect, under a small frame; keep them near the glass, but shaded from the sun; give air by drawing the lights off the frames for half an hour in the morning, and then close them for the remainder of the day; protect from frost; and the young plants will appear in five or six weeks. The properties which constitute a perfect auricula for exhibition, are :—1st. A *well grown plant*, compact habit, foliage nearly covering the pot. 2nd. *Flower-stem* six inches in height, round, upright, and sufficiently strong, to well support the truss of bloom. 3rd. *The Truss* should be round, and compact, showing seven or more pips, without the slightest division. 4th. *A Ball Truss* is the more perfect bloom, but it may be shown with a gourd leaf. 5th. The *Foot-stalks* of the flowers should be strong, elastic, and well-proportioned. 6th. *The Pips* must measure from one inch to one and a quarter in diameter, free from indenture, and perfectly flat. 7th. *The paste* is required to be smooth, fine in texture, pure white, forming a circle half the width of the tube. 8th. *The Ground-colour* must be solid, dense, and rich, forming a circle on the inner side; the outer should be finely broken into a feathery band, clean on the edge; it may be broad or narrow, but must not break through to the outward edging; the marking may be black, red, brown, or violet, but no shade of any other colour must intermingle. 9th. *The Margin* is required to be of a permanent green, grey, or white, quite circular, but not limited to width. In selecting a pair of auriculas for exhibition, always choose plants of the same height. This is greatly in favour of insuring a prize. The following are a few good varieties for exhibition:—

GREEN EDGES.—Page's Champion, Hudson's Apollo, Booth's Freedom, Lee's Colonel Taylor, GREY EDGES.—Dickson's Unique, Dickson's Matilda, Hedge's Britannia, Fletcher's Ne plus Ultra. WHITE EDGES.—Taylor's Glory, Taylor's Favourite, Cheatham's Countess of Wilton, Clegg's Crucifix. SELFS.—Netherwood's Othello, Redman's Metropolitan, Headley's Royal Purple, Smith's Mrs. Smith.

This list might be very considerably enlarged. I shall have much pleasure in attending to the wishes of any persons in this respect.

APHELANDRA AURANTIACA AS AN ORNAMENTAL AND WINTER FLOWERING PLANT.

By William Wood, Fishergate Nurseries, York.

This is, without exception, the most brilliant-flowered hot-house shrub, of dwarf and compact habit, yet introduced, forming a neat, yet robust, dark-green, laurel-leaved plant, from two to twelve inches in height. In appearance it may very aptly be compared to the well-known *Aucuba japonica*, but with its ample mottled leaves exchanged for those of a remarkably large-leaved evergreen, of a rich healthy hue.

There is a peculiarity of growth about it, which offers an interesting fact for elucidation to the physiologist, and of equal importance to the cultivator, as a key to the theory upon which its successful culture depends. The following remarks are offered in relation to the temperature, soil, and locality, which appear essential to its continued vigour of growth, and formation of bloom, being the result of practical observation and experiment upon the first plants introduced to this country, which were under the writer's charge, and from which the published figures were derived. The most obvious and striking feature in which it appears to differ from its allied species, and indeed from most other known plants, is the eventually pendent position its large, healthy, laurel-like leaves assume, as though in a state of collapse. From the experiments to which the plants alluded to were subjected, for the purpose of multiplying them, it was found that a high bottom (or root) temperature was essential for obtaining a vigorous growth, and more particularly if the plants had been exposed to an ordinary stove temperature for some time previously, and equally so under all conditions in attempting to re-accumulate its vigour by exciting its dormant axillary buds. As evidence of the slow circulation, and viscid nature of its elementary fluid or sap, after the plant has attained its mature growth, and expended its bloom under the temperature most suitable for its expansion, I have seldom or ever been able to excite both the opposite buds at any axil or leaf-joint sufficiently low for obtaining a vigorous after-growth, one of the two buds generally remaining dormant; and hence it was found essential, either for obtaining continued growth or for re-accumulating its vigour when pruned back to a convenient length, to have recourse to a strong atmospheric stimulus. Such appears to be its constitutional endurance of heat during its season of growth, and impatience under an ordinary stove temperature (except for the perfection of its bloom), that I consider it impossible to continue the vigour of the plant equal to the production of bloom, unless pruned back to a suitable length, to induce a vigorous terminal growth, and placed under *the highest genial temperature of which a tropical house admits.*

The most suitable position for obtaining the growth alluded to, would be either in a newly-made tan-pit, or upon a bed heated by the tank system (the latter preferable for its uniform temperature); and where neither of these can be had, the plant should be cut back, along with the generality of others requiring strong heat, at the period when a close genial temperature is about to be observed, in spring, for obtaining vigorous growth throughout the hot-house department. The plant should remain in the same pot in which it bloomed, until its new shoots are formed, after which it should be shifted, and its growth continued until the leaves appear to have attained a mature size, and then gradually placed upon a cool surface, preparatory to a warm position in the stove or hot-house. As autumn and winter is the most natural season for unfolding its bloom, plants may be pruned back until late in summer or early in autumn, providing the requisite stimulant of bottom or root-temperature is at command, that such plants or cuttings require. At an advanced period they should be exposed to a high temperature until the appearance of the flower-spike. Every crown, or shoot, detached from the parent plant during the summer and autumn months, if exposed to the conditions now described, will each produce a large terminal raceme of bloom. Under whatever aspect the growth is obtained, each plant should be placed under a free exposure to light previous to the flower-buds opening, under the influence of which they will gradually unfold their remarkably large imbricated racemes of flowers, eclipsing all others in their dazzling brightness.

During the growth of this plant under intense heat, the foliage maintains its horizontal position at right angles with the stem; but on exposing it to a progressively lower temperature, it gradually assumes its pendent position. As an ornamental plant for winter, it forms a very beautiful and picturesque object. Its peculiarly vivid tint of orange-scarlet, is the nearest approach in its elegant flower-spikes, to *Euphorbia Jacquiniflora;* but that, proverbial as it is for surpassing the painter's skill, is still more inimitable in the present subject, and its precocious development of bloom is perhaps unexampled amongst plants, considering its peculiarly robust yet neat habit of growth. During the recent months of December and January, six plants were in bloom in the establishment from whence these remarks are dated, varying from two to six inches in height, and in both the flower-spikes exceeded the mean height of each plant! One plant was a fine instance of luxuriant vigour, its stem being four inches in height, and surmounted by a large imbricated raceme of flowers six inches in length, whilst the diameter of its leaves from their opposite extremities was sixteen inches!

The soil most suitable for its growth is somewhat more than one half of sandy, turfy loam, in a well-decomposed state, the remaining portion of friable heath-mould. For dwarf habit, easy culture under high temperature, and brilliancy of effect it is unrivalled, and is certainly indispensable in every good collection of tropical plants.

The finest grown specimen I have yet seen is at Nonsuch Park, Surrey, under the skilful management of Mr. Carson, gardener to W. T. G. Farmer, Esq.

REMARKS ON THE CULTIVATION OF TEA-SCENTED ROSES AS CONSERVATORY CLIMBERS.

By Mr. Paul, Cheshunt.

WHO can contemplate with indifference the beauty, variety, and perfume of the Queen of Flowers? or who can fix a limit to the circle over whose affections she holds sway? Cherished alike by peer and peasant, her circle of admirers is wide as are the dominions of our beloved Sovereign—the Rose of England. Growing spontaneously in almost every latitude of the northern hemisphere, admired alike by the highly civilised inhabitants of Southern Asia, and the less-favoured natives of the icy north—wheresoever it dwelleth, its presence is hailed with joy and gladness. Sweet emblem of innocence, of virtue, of humility, whence derivest thou that power which gives thee such an influence over the mind of man? Truly, the Rose of the desert, in its loneliness, is suggestive of modesty and retiring worth; and the gorgeous masses of our flower gardens are realisations of beauty, elegance, and grace. No wonder, then, that thy declared admirers are so numerous; that thy presence should be sought so eagerly amidst the motley throng. No wonder that thou greetest us at every step, from the garden of the humble cotter to the Rosetum and conservatory of the wealthy and the great.

But it is to advocate the claims of a particular class of Roses, for a particular purpose, that I now take up the pen; and these are the Tea-scented Chinese. What we have said of other Roses may be said of them; although the eye of the florist may pronounce them less perfect than the descendants of other species. The large guard petals at the circumference of the flowers, and the want of regularity in the arrangement of the inner petals, are not, perhaps, exactly in harmony with his taste. And we do think that their condemnation by some florists has, in a great measure, blinded the flower-loving public to their merits. Without courting controversy, we feel it incumbent on us to state our views in reference to this point, believing that a just estimation of their value would lead to their more general cultivation. And, first, let it be remarked that we do not yield them up as florists' flowers. Indeed, *they are not*—if successful strivings to bring them to an ideal standard be the criteria of such. They resist this arbitrary process; and in proportion as they approach what it is said they should be, they lose their own peculiar properties, merging all their natural beauties in one single fancied point. Fortunately, however, they are not very tractable in this respect. The Tea Roses originated in 1848 resemble those of 1810; they have the large guard leaves, the irregular disposition of petals, and, for the most part, the same drooping habit and glossy leaves as those of yore. Notwithstanding this, the varieties we possess furnish us with abundant proof that the object has been attempted; and the slight alteration apparent, consisting in the size of the flowers and variety of colour, we believe not due to the breeding for a particular result, but the natural results of cultivation. Strange that they should thus resist change, when the types of other groups, of more recent origin, are lost in the varying characters of the floral races. Beautiful in their irregularity, distinct in their properties, unique in appearance,—we confess that we admire them above all others, and that their charms for us would depart, were they aught else than what they are. As well might we complain of the diversified surface of the landscape, as of the graceful irregularities in this charming group of Roses.

It has been said that the objections of minds floriculturally schooled, has done something to render them unpopular; but there is another cause, existing in their delicacy, and susceptibility of frost. It is not intended here to dwell upon their culture in the open air—though I have proved, by experiment, that they may be grown successfully, and with little trouble, in this manner. We will, for the present, dismiss this point. I intend here to confine my remarks to their cultivation as climbers for the conservatory.

But am I at the outset met with the response "We have abundance of such plants." Then I rejoin "Is not the variety these will afford, combined with a delightful fragrance, a sufficient plea for their introduction? Then of their cultivation.

We will suppose plants intended for this purpose to be purchased in the spring. They are perhaps in small pots, therefore unless the situation be freely exposed to air and light, they should be shifted into larger pots, using a compost of leaf-mould and loam, and cultivated with care during the first summer. In the spring following they will be strong and well rooted, and may be planted out in prepared soil—loam and leaf-mould as before. They may be pruned rather closely, and watered with weak liquid manure as they become dry; and the growing shoots trained with care according as they are wanted to clothe round pillars or trellis-work. They will probably rise from two to three feet the first year; and as they become evergreen under this treatment, they will grow and flower almost incessantly, even in the depth of winter, if suffered to do so. But as a period of rest is necessary in order to ensure rapid progress, this may be granted about midsummer, when Roses abound out of doors,—or immediately after a general flowering,—by keeping the soil about the roots perfectly dry. When it is thought desirable to excite a new growth, it is only necessary to prune and water the plants, and the end is attained. If they are fortunate enough to escape pruning by the cutting of the flowers for bouquets, a second pruning on the completion of flowering will be needed, and at this time any misplaced or unhealthy branches should be removed. The same course of culture may be gone through from year to year, training up the topmost branches till the height desired be attained.

For the satisfaction of any who may doubt the adaptation of Tea-scented Roses for this purpose, I would state that there are several plants in the conservatory at Orleans House, Twickenham, from ten to twelve feet high, and at the time I saw them, about a year and a half ago, they were most beautiful specimens, clothed with large handsome foliage, the flowers regaling us with their delicious sweets. The plants in the border of the conservatory of the Horticultural Society of London, may be referred to in support of our position; these, I should think, (speaking from impressions only,) are eight or ten feet high, and there are specimens nearly equal the size and beauty in many other places.

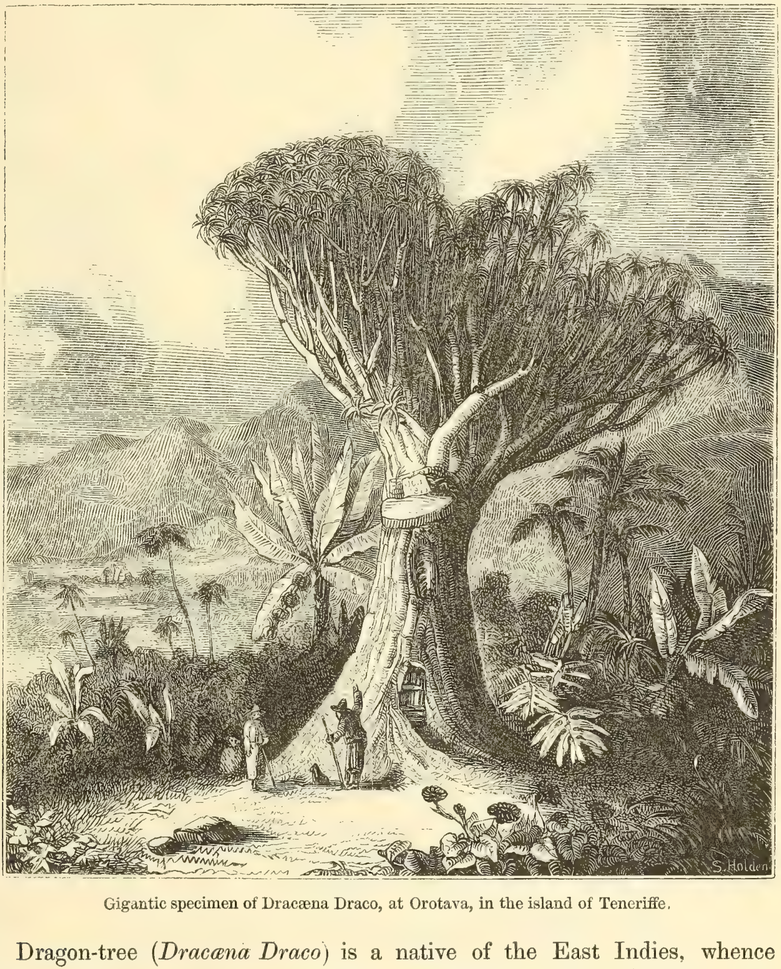
In conclusion, allow me to offer a brief list of kinds suited for the purpose.

Abricote; fawn, apricot centre.
Belle Allemande; cream, shaded with blush.
Bougère; rosy bronze.
Buret; rosy purple.
Clara Sylvain; pure white.
Delices de Plantier; coppery rose.
Devoniensis; pale yellow.
Eugéne Desgaches; clear rose.
Goubault; bright rose, centre buff.
Julie Mansais; pure white.
Lynnais; rose, and rosy lilac, very large.
Madame de St. Joseph; salmon pink
Marie de Medicis; rose, centre fawn.
Niphetos; pale lemon.
Originale; blush, centre rose.
Safrano; apricot changing to buff.
Souvenir d'un Ami; salmon, and rose shaded.
Triomphe du Luxembourg; coppery rose.

ON A SUCCESSFUL EXPERIMENT WITH THE DRAGON-TREE (DRACÆNA DRACO).

By Mr. John Bain, College Botanic Garden, Dublin.

I BEG to lay before you a brief account of an experiment which I made on a large Dragon-tree, at the College Botanic Garden, Dublin, and which I commenced about three years ago.



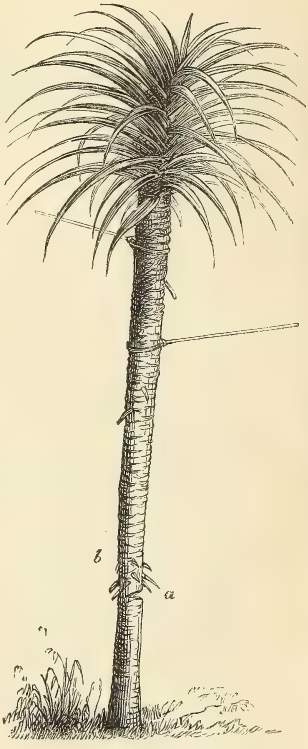
Gigantic specimen of Dracæna Draco, at Orotava, in the island of Teneriffe.

The Dragon-tree (*Dracæna Draco*) is a native of the East Indies, whence it was introduced to Europe in the year 1640. Dr. Lindley, in his admirable work, "The Vegetable Kingdom," says, "Dracænas, the most gigantic of the order, attain their largest size in the Canaries; a *D. Draco* is there described as being between seventy and seventy-five feet high, forty-six and a half feet in circumference at the base, and was known to be very ancient in the year 1406."

In the early part of 1842 our plant in the College Botanic Garden was quite against the roof of the house, when I proposed the experiment, which was then generally considered impracticable. Consequently the room was enlarged from twelve to twenty feet in height. In 1846 the tree again fully occupied the limits assigned to it; so much so, that some of its leaves made their escape through the glass in the roof. There was then no alternative left but to proceed with the experiment, further enlarge the house, or destroy the fine specimen; the former was chosen on my assuring my friends of the certainty of success, as well as proving its being by far the most economical plan; for where the object is to keep a considerable number of large plants together in one house, it would be very injudicious to allow a single species to occupy too much space. From the structure of the plant in question, and its tendency, as well as that of many other plants from warm countries, to throw out aerial roots, it occurred to me that if completely separated from the main root, it would still continue to grow, or at least remain healthy until circumstances favoured its sending roots into the soil.

Having explained the point to be gained by the experiment, I shall now state as faithfully as possible the means by which it was accomplished.

In the first instance, the plant stood twenty feet high, girth of stem three feet six inches, circumference of head sixteen feet; it was secured with braces and ropes so as to guard against any accident, and to prevent its position from being in any way changed. At about four feet from the surface of the earth in which it was growing, I made an incision (*a*) half an inch deep, to the extent of half its circumference, applying lime immediately to dry up the wound from which the sap oozed in considerable quantities. In this way I continued deepening the incision, making sure to dry it perfectly, until the stem was finally severed. We next removed the lower part of the stem, with all its roots, leaving the top of the tree suspended from the roof for several months, during which time my anticipations were fully realised, by the growth of strong, healthy roots from between the woody structure and the bark-like substance (*b*). Our tree, or, as I may call it, gigantic cutting, being now ready for insertion in the soil, was accordingly lowered into the place occupied by its former roots, every care being taken to supply suitable compost to induce a vigorous growth. It has been replanted about four months, and is quite as healthy and thriving as it was before being disturbed. I may remark that the success of the experiment mainly depended on the slowness with which it was carried on, and the precautions taken to dry and harden the stem.



I should not have troubled you with the above details, which, in themselves, may appear dry and uninteresting, but from the interest evinced in the success of the experiment, by the learned professors Allman and Harvey, and my excellent friend Mr. Mackay, the curator of the College Botanic Garden. I am also led to hope that the experiment may prove useful to parties similarly circumstanced; for I think all Endogenous, and many Exogenous plants, which produce roots from their stems, may be reduced in height in the same manner.

NOTES ON THE CULTIVATION OF SARRACENIADS (Sarraceniaceæ).

The natural order, Sarraceniaceæ, at present consists of two very distinct and singular genera, *Sarracenia*, and *Heliamphora;* the first containing six known species, and the latter only one.

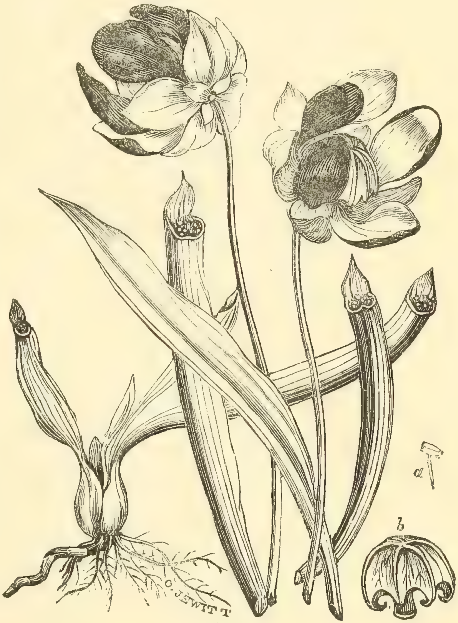
All are herbaceous plants of low growth, with fibrous roots, radical leaves, and the petioles forming hollow tubes or pitchers, open at the top, with concave lids, which, however, when the leaves are mature, do not cover the orifice; and the interior of each pitcher is thickly covered with reflexed, secreting hairs.

The species of Sarracenia introduced to this country are S. Drummondi, flava, minor, purpurea, rubra, and variolaris.

Of S. Drummondi we know little, except that it was found growing in the same localities as the other species, is of dwarf habits, has purple flowers, and was brought to this country in 1829.

Sar. flava has large funnel-shaped leaves, two feet or more long, with a spreading throat, and a large appendage. The flowers are greenish yellow, tinged with brown.

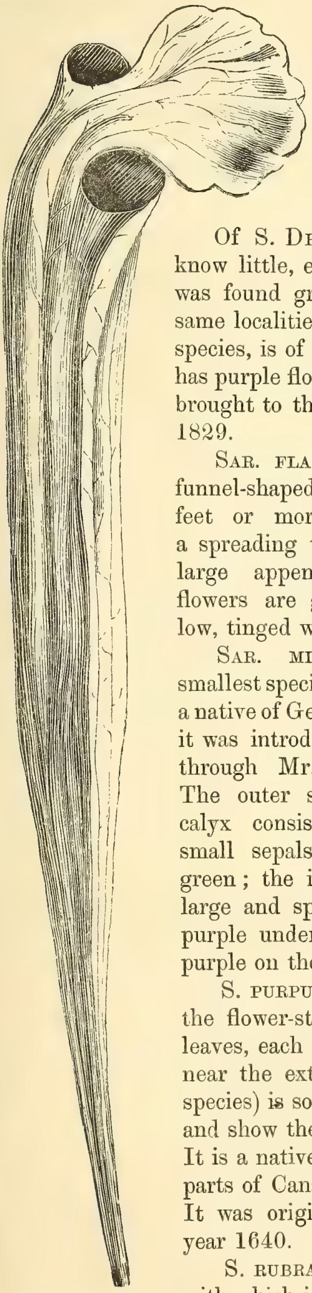
Sar. minor. — The smallest species yet known; a native of Georgia, whence it was introduced in 1829 through Mr. T. Nuttall. The outer series of the calyx consists of three small sepals of a bluish green; the inner series is large and spreading; green on the upper side, and slightly tinged with purple underneath, and at the margins. The petals are of a bright purple on the under side, and tinged with purple on the upper.



S. Minor.

S. purpurea.—This plant, in its flowering state, is very handsome; the flower-stalks rise a foot or more high from the centre of the hollow leaves, each surmounted at the top with the flower, which, by a curve near the extremity of the flower-stalk (a character common to all the species) is so reversed, as to turn the top part of it to face the leaves, and show the gay carmine purple of the petals to the greatest advantage. It is a native about Quebec, Lake Huron, and perhaps throughout most parts of Canada, as far northward as Bear Lake, and south to Carolina. It was originally introduced by Mr. John Tradescant, jun., about the year 1640.

S. rubra.—This truly beautiful species is less known than *purpurea*, with which it is often confounded. It is, however, more scarce than the



Leaf of S. Flava.

last, and is perhaps not so easy to manage. The flowers are elevated on larger stalks, are of a darker crimson colour, and the leaves more like those of *S. flava* in form; but beautifully veined with crimson veins. It is a native of Georgia and Florida, and is probably confined to the southern United States. It was originally introduced in 1786, and has been called *S. psittacina*; but it would appear from recent observers, that this is a very different plant.

S. VARIOLARIS is not unlike *flava* in habit; but is at once distinguished from that species by its smaller size; spreading, not dependent petals; and the diaphanous spotting at the upper part of the back of the tube of the leaf. It is a native of the open swamps of North Carolina and Florida, where it grows in sandy soil. The flowers are geenish yellow. It is the *S. adunca* of *Smith's Exot. Bot.*, and was introduced in 1803.

Although the whole of these are found inhabiting the low swamps of North America, they do not thrive in the open air in Britain generally; there have, however, been instances in which they have grown well for a time in such situations. They are found to do best in a frame placed in a warm and shaded situation, or in a shady part of the stove, where the heat is not very strong.

All the species should be planted in pots, filled with pieces of peat at the bottom upon the drainage, and sphagnum at the top, with the pots placed in pans of water; they also do very well planted in moss, without pots, in a frame; but either way they must be kept moist, and quite shaded. Our plants at Chatsworth are potted as directed, and stand in pans of water, near the glass, on the east side of the large conservatory, where they grow freely, and flower every season profusely, during the months of June and July. In winter, when the plant is in a state of torpidity, a less quantity of moisture is requisite.

The generic name was given by Tourneforte, in honour of Dr. Sarrazin, a French physician, resident in Quebec, who sent this genus to him from Canada.

HELIAMPHORA NUTANS is the only species known of this new and singular genus. It was discovered by Mr. Schomburgk on the mountain of Roraima, on the borders of British Guiana, where it grew in a marshy savannah, at an elevation of about six thousand feet above the level of the sea.

The habit, roots, pitchers, and general structure, are the same as in Sarracenia; but the scape of *Heliamphora*, instead of being single-flowered as in *Sarracenia*, bears a loose raceme of from two to six nodding flowers, borne on short pedicels. The floral organs differ chiefly from those of Sarracenia in the great reduction in the number of parts. Instead of three distinct series of floral envelops, *Heliamphora* has but four, five, or six *leaflets* altogether, of which the external are somewhat thicker and more herbaceous than the more internal ones, though all are, to a certain degree, petaloid and coloured. The *stamens* are indefinite, and placed as in Sarracenia; the *ovary* is only three celled instead of five; in other respects, the number, arrangement, and structure of the ovules agree with Sarracenia. The *style* is erect and cylindrical, and has no tendency to that remarkable foliaceous expansion observable in the Sarracenia.

The name is derived from *helos*, a marsh, and *amphoreus*, a pitcher.

The only method at present practised to increase these plants, is division of their roots.

ON THE APPLICATION OF THE DECORATIVE ART TO GARDEN POTS.

By Mr. John Spencer, Bowood.

If we may judge by the prevailing taste of the present day, we are midway in what may be termed the transition state from the plain matter-of-fact principles, which have hitherto principally guided us both in business and decoration,—to that period when the highest efforts of artistic skill are brought to bear, not only on purely decorative objects, but also on more common articles. That such a period has arrived in the history of all nations who have been celebrated for refinement and civilisation, there is abundant testimony to prove. No one can for a moment behold the restored treasures of the ancient Egyptians—the relics of Etrurian pottery-ware—or the matchless sculpture of the Greeks and early Romans, without being forcibly convinced, how highly the decorative art was prized by them, and of the high degree of refinement requisite, to design, execute, and appreciate objects, which, generally speaking, we, as a nation, are only beginning to understand and value. I need scarcely refer to the mediæval ages for corroborative proof. The decoration of tapestry, the embellishment of missals, and the carving with which the most trifling articles were enriched, all bespeak an appreciation of the ornamental and decorative styles, in an age not otherwise remarkable for the refinements of civilised life.

At the present time, in our own country, and more or less in others, the attempt at restoring the true decorative style, both on objects justly considered within the pale of the fine arts, and on those more common utensils pertaining to our daily wants, which have hitherto been considered unworthy of such distinction, is daily pushing itself into notice. We may hail this as unmistakeable evidence, that an appreciation of the beautiful and decorative in art, is fast pervading society at large.

I have been led into making the above remarks on reflecting what might be done by way of improving the appearance of that most useful, common, and certainly at present, most unornamental piece of pottery, "*the Garden Pot.*" Gardeners have hitherto been content with it, in its plain unpretending form—and it may fairly be questioned whether any utensil employed either in gardening or agriculture has passed through the hands of so many generations with its primitive form so little altered, as the subject of my present remarks. It is true, Mr. Forsyth some years ago recommended to have them glazed, or varnished—for which piece of advice he was unanimously voted an innovator, and I believe the plan was never put into practice. Some modification in its form, too, has been brought into notice, in the shape of the "West Kent Garden Pot;" but these, in so far as ornament is concerned, are not a whit before the original patterns. Again, lately, a substitute has been invented for our old friends, in the shape of "Slate Tubs,"—now, I had always an inkling that these latter would be a great improvement, as regards appearance at least, to the common garden-pot; but after seeing a stage of plants growing in these "miniature orange tubs," I was so struck with their prim formal appearance,—producing impressions so unfavourable to my preconceived ideas of beauty, that I determined, in my own mind, they would never succeed, where taste was called in question.

Perhaps some of your readers may not be aware how far the decorative art may be carried into effect on the common flower-pot, and the wide field it opens for design in their embellishment; several attempts have been made, one of which has come under my notice, and as they have stood with comparative safety for twelve years to my knowledge, I am enabled to speak as to their durability—and the pots I am now about describing, were, I believe, made at Sherborne, and are of a large size. They are (to all appearance) made of the common pottery clay, in moulds. The rim of the pots at top and bottom are embossed with foliage and flowers, and festoons of the same, in high relief, are carried round the sides. There is likewise an elaborate border towards the bottom in the same style, The foliage, &c., has all the sharpness of outline, so valued in sculptured relievo. Altogether, they are the most decorative article I ever saw made for plants. Now, it has often struck me while admiring the magnificent plants which annually crowd the tables of the metropolitan exhibitions, how much pots of this description would enhance the beauty of the plants exhibited. It must be admitted that the value of all objects is increased by comparison, as they approach a certain point, or degree of excellence. The plants themselves are many of them matchless specimens of the gardener's skill. Nature and art cannot go much further in cultivation. The pots, on the contrary, are neither better, nor perhaps worse, than they were fifty years back,—try to embellish them, and make them worthy as works of art, to be viewed with satisfaction, in connexion with the choice treasures they contain.

The reader must not suppose, that pots thus decorated, are recommended to be universally used, such would be a misapplication of taste ; but for plants to bloom in, for the conservatory, and for plants intended during the summer to ornament the flower-garden or parterre, such pots would harmonise with the surrounding objects and scenery, and by their warmth and colour, form pleasing objects of themselves, independent of their proper uses.

I am aware several other attempts have been made by parties to introduce this description of pot to public notice ; but I have seen nothing executed so artistically as those described above. In conclusion, allow me to express a wish that this short notice may be the means of directing attention to the subject, and to the wide field it opens for British taste and skill.

ON THE CULTIVATION OF THE AVOCADO, OR ALLIGATOR PEAR, AS A TABLE FRUIT.

The Avocado, or Alligator Pear, is the *Laurus Persea* of Linnæus and the old botanical authors, and the *Persea gratissima* of *Gaertn.*, and our present catalogues of plants. It is a native of the West Indies, where it is extensively cultivated for its fruit, which both here and on the continent of America is highly prized, It is also found extensively in the New Continent; and Mr. Purdie, in his travels through Columbia, met with a gigantic forest of these trees, about 2000 feet up the slope of the Nivada, where he describes the foliage as very luxuriant, and the delicious fruit so abundant, that the ground was literally strewed with it.

In its wild state it usually forms a tree from forty to fifty feet high, with a trunk about two feet in diameter, but in a cultivated form it rarely exceeds thirty feet, with a spreading head, and a stem about the thickness of our common apple trees.

Description. Plant a tree. *Bark* smooth, ash-coloured. *Branches* succulent, tender, scarcely able to support the large fleshy leaves. *Leaves* alternate, oblong, smooth, resembling those of the common laurel (*Prunus Lauro-Cerasus*). *Flowers* produced for the most part at the extremity of the branches, of a greenish yellow, and inconspicuous. *Fruit* the size of one of the largest pears. *Pulp* covered with a tough skinny coat, of a pretty firm consistence, with a delicate rich flavour, containing a large rugged seed, which is wrapped up in one or two thin membranous covers.

The fruit is much eaten by all classes of society, both in the West Indies and America, being considered a necessary article at the breakfast-table; and a friend of ours, who resided many years in America, informs us, that it gains upon the palate of most persons, even those who do not like it at first.

The flavour is delicate and rich, but it is seldom eaten alone ; some persons use pepper and salt, some lemon or lime-juice, others sugar, and others wine, to give it pungency; all agree that the fruit is calculated to improve the appetite, and is otherwise beneficial to the body. No tropical fruit is, perhaps, more universally relished than this ; it is agreeable to the negroes, almost without an exception; horses, cows, dogs, cats, and most if not all the fruit-eating birds, feed upon it; and Europeans almost unanimously agree that it is delicious and nutritive.

It was introduced to this country in 1739, but has not yet, that we are aware of, been fruited in any of our stoves. In the large conservatory at Chatsworth, our plant grows vigorously, and promises in a few years to become a fine tree; but as yet it shows no disposition to produce fruit.

In cultivation, the temperature of a warm stove is requisite, with a little bottom-heat at the roots, and much the same kind of management as given to the Cinnamon (*Cinnamomum verum*), to which plant in habit it bears a considerable resemblance. During the growing season, give a liberal supply of both heat and moisture, and especially keep the atmosphere humid. If the plants are grown in pots or tubs, a mixture of loam, peat, and well-rotted manure, is the best for them; but if planted out in a prepared border, a good rich loam, without any admixture, is preferable.

Propagation is effected by making cuttings of the half-ripened wood, and planting them, without mutilating the leaves, in pots of sand, and placing them under a glass in heat. They may also be increased by layers and abscission.

The name *Persea* was used by Theophrastus for an Egyptian tree, but of what kind is at present unknown.

BRITISH OAKS—THEIR SPECIES, VARIETIES, USES, AND CULTURE.

(Continued from Page 20.)

By Mr. C. M'Intosh, Gardener to the Duke of Buccleuch, Dalkeith Palace.

THE Oaks under consideration are reared from seed; the curious varieties, increased by inarching or grafting on the common species. The seeds or acorns should not be gathered off the tree, because it is inconvenient and useless, and might lead to gathering them before they are fully ripened; they are best, therefore, when gathered from the ground as they naturally fall off. At this period of tree-cultivation, the first, and not the least, error is committed; instead of allowing those totally ignorant of the business to collect the seeds indiscriminately, a competent person ought to be sent along with them, to point out the trees from which the acorns should be gathered. We all know the importance of selecting the best formed turnip, or cabbage, from which to save the seed, and take the necessary precautions accordingly; but who amongst the nurserymen makes any inquiry as to even what species of Oak the acorns are gathered from?—far less, whether from a healthy and well-grown specimen, or the reverse. If, to have an improved progeny, we go to some expense in the one case, why not in the other? Both are surely entitled to our attention. I think also that acorns should only be collected in the oak-growing districts of England, and that no Scotch acorns should be sown, which they often are, even in seasons when they are only imperfectly matured; nor those even of England, when the trees are not in a thriving state.

In the formation of many of the German forests, the acorns are planted where the trees are intended to grow, and it is surprising how they will grow by this process. The ground is loosened with the spade, and the seed is committed to the soil without further ceremony. The best German foresters adopt a much better plan by ploughing the ground, if it is susceptible of such an operation, and where it is not, they trench; while, if the ground be already partially occupied with trees, they loosen a space of from a foot to eighteen inches in diameter, and in these set the seeds. They found their practice on the course Nature pursues, in forming natural forests. They follow her example, and say, she is right; and contend, and no doubt with a vast degree of truth on their side, that natural-grown timber is superior in quality, and of more rapid growth, than that which is artificially planted. In this opinion they are followed by many high authorities in our own country, and amongst them by the late Earl of Haddington, a great planter in his day, who says, "If I could raise all my trees from the seeds without removing them, it would be the best way; but I have given reasons why it cannot be done. In all the authors I have read, there is one positive order that I never follow, viz., cutting off the tap or carrot-root of the oak." And Sang, a most experienced planter, is of a similar opinion. He says, on the subject of rearing wood, "One rule we must invariably adhere to; namely, to *sow*, and not to *plant*. All the woods of nature are raised from the seed sown on the spot where the trees grow; and we are certain that her timber trees are never inferior, but often superior to such as have been planted by the hand of man."

This is a question of time as well as of opinion. We all know the great value of natural-grown timber; but time sufficient has hardly elapsed, to test satisfactorily the difference between it and the artificially-planted oak, that is to say, oak of full maturity, to which it cannot arrive in half a century; and this embraces the period the question has been under discussion. We know, however, the superior quality of our natural-grown Pine, and the almost worthlessness of artificially-planted Scotch Fir. If we reason from analogy, the preponderance would be in favour of Oak also reared from seeds, sown where they are to remain.

The authority last quoted, proceeds to say, "We consider a tree having its original roots thus abridged," that is by transplanting, "as advancing pretty nearly in its nature to a cutting, or layer, which is well known seldom attains to the size of a tree of the same kind raised from seed. In short, we hold that the entire preservation of the perpendicular, or tap-root, projected from every seed by nature, with all its fibres, is the surest and most effectual means of obtaining the great object in view, namely, perfect timber; and that, every abridgment occasioned by the subsequent removal of the plants, must derange the flow of the juices. Hence the want of success generally attendant on the re-planting of large trees. Indeed, the younger that trees can be removed, and planted in the field for good, so much the more will the progress of their growth be accelerated, as has been well ascertained by experience. For these, and like reasons, we give the plan of raising woods, forests, and copses, from seed sown where they are to remain, a decided preference."

The Continental nurserymen frequently germinate all their large seeds, such as acorns, horse-chestnut, &c., in damp sand, and in a temperature of from 50° to 60°. When the young shoot has extended to the length of about two inches, they nip off its point, and then sow the seed in the usual manner, taking care, however, not to injure the sprouting radicle. This process has the effect of causing the tap-root to send out numerous side roots; an effect favourable to the process of transplanting, but not so to the growth of the plant, at least for a time.

The trees so treated, are at two or three years' growth, planted in their permanent situations, and when as many years established, they are cut down to the ground, after which they send up several strong shoots, and send down perpendicular roots; all these shoots are rubbed off early the first year of their appearance, excepting one, which should always be the strongest. The tree then makes as rapid growth as if it had been sown on the spot, and in bad soils even more so. I notice this practice without recommending it.

As regards the preparation of the soil for forest trees, either by ploughing or trenching, opinions are very variable: Mr. Sang declares that it has no effect whatever on the quality of the timber, or longevity of the trees, but that it gives them more rapid progress in the first period after planting. Mr. Withers, and with him many English planters, lay great stress on this; and trench from eighteen inches to even three feet, and in some instances use manure at the same time. It should be, however, remarked that the preparation of the latter is in general for large trees, say from four to six feet in height, and in a good climate, whereas the former plants small trees of only a few inches in height, and in a climate much colder; indeed Mr. Sang, instead of planting trees, often sows the seeds. Whether the trees be planted, or the seeds grown, we maintain that far greater pains should be taken in preparing the pits for them, than is usually done, for few operations in their culture are performed in a more careless and slovenly manner than that of planting forest trees. Although we see the splendid larch forests of Athol, Breadalbane, and throughout all the Highlands of Scotland, flourishing in a wonderful degree; and knowing from experience (having superintended the planting of some square miles of the Grampians myself), that the roots were thrust in the soil (where there was any), and when not, between the fragments of half decayed micaceous rock, with the diamond-pointed dibble, as spades in my case could not be used, in a very careless manner; still we see the trees in a thriving condition, not excelled in Europe: but those were in many cases two-year old seedlings, and in most only one year transplanted. The roots again of the Coniferæ extend horizontally and not perpendicularly, hence less need for preparing the soil.

The case is wholly different with the Oak, whose roots descend in a perpendicular direction naturally, and when prevented from doing so by the hand of man sustains a serious injury at the outset, which few of them overcome. The pits, whether for the reception of the tree, or (when filled in) for the seed, should be loosened as deep as possible, and the ground, if not trenched or ploughed, made as open and pervious as the nature of the soil will admit. The trees, if a forest or profitable wood be intended, should be planted young, say two-year old seedlings—but not small trees, the cuttings of the overgrown seedbeds, resembling the others only in size. Trees of this size require less protection because they are surrounded with rough herbage, and probably a sprinkling of furze, the best of all shelter, as when the trees grow up the furze disappears, and allows a free circulation of sun and air into the plantation. Cattle, however, must be excluded by proper fencing.

It has been a favourite practice to crowd the ground planted with Oaks, with larch, Scotch fir, or, indeed, with anything that will grow; or to plant them in jungles, already too crowded with brushwood and brambles. Here the second great error creeps in, and which is even as bad as the first; if the situation intended to be planted with Oaks be so cold as to require protection, it were better not to attempt it at all, but to substitute larch for it. The word "nurse," as it is called among planters, ought to be expunged from their vocabulary. If the Oak were more tender and less capable of resisting cold when young than it is when old, then there might be some propriety in affording it shelter; but as such is by no means the case, keep out nurses altogether, which only act as robbers of the soil, and deprive the Oaks of their necessary amount of light and air, and this every year increasing just in proportion as the Oaks require it more. Another and very general evil attends the nursing system; they are left too long either from inattention, for a cover for game, or from a desire to make something of them when of a large size; the Oaks, which ought to be the chief object in view, suffering all the while.

Again, when these said nurses are removed, in what condition are the Oaks to withstand the cold? They have in youth been nursed up in a warm sheltered place, one-half being suffocated from want of air, and the remainder weakened in constitution from starvation; and in that debilitated state they are exposed to the same degree of cold that they were considered incapable of bearing in youth. If the ground be covered with heath, fern, or pretty rough herbage, these are all the protection young Oaks require; and even these, it may be observed, if not attended to during the first three or four years after planting or sowing, may be as injurious as artificial planted nurses. The trees will not, under these circumstances, be drawn up like ship-masts, each striving with the other to catch a glimpse of the sun by even its topmost branches; but they will attain their natural character, and develop themselves in full proportion, making more growth of timber in three years than others will in five. From the well-known rules followed in cultivating every species of vegetable, it has been abundantly proved that a given area of surface can only maintain a certain amount of the food of plants, and the same will hold good in regard to light and air.

Draining, in all soils where required, should not be neglected; in undrained soils the Oak will not flourish. The system of draining will depend on local circumstances. Still it is probable that no system is better than that of tiles, for open drains are objectionable;

they make it inconvenient to walk through and examine the woods, and soon become choked up by the decomposition of leaves and other vegetable matter.

Thinning and pruning must be attended to as the trees progress. Much has been written on this subject to little effect, for no general rules can be laid down that will be applicable to all cases. Much of this must therefore be left to the judgment of those having the management of woods.

In regard to felling the timber, the grossest errors have been fallen into; the timber has, in nine cases out of ten, been sacrificed to the bark, as if Oaks were grown for tanning purposes only. It were better to depend on copses for our bark, which we know to be the best for the tanner; or to extend the cultivation of the Oak, upon that principle, on soils and in situations, where they would not attain the size of full-grown timber. If the bark of mature trees bring little, or even nothing, let it be so; let us import the deficiency of bark from the Continent; nor is it absolutely necessary that we should, in these days of invention, depend entirely on oak-bark for tanning purposes. Cut off the supply, and the tanner will soon find substitutes, several of which are already well known, and his own ingenuity will discover others; for, strange as it may appear, the tanner has made far less progress in the improvement of his art, than persons of almost any other profession whatever.

The above remarks, it is scarcely necessary to observe, refer only to the production of Oak-timber in its full degree of excellence, whether for civil or naval architecture.

ON ORNAMENTAL PLANTING.

(Continued from Page 23.)

By Mr. Kemp, the Park, Birkenhead.

The size of tree we should generally recommend for ornamental planting is from three to five feet high, and chiefly below four feet. These we have found from experience make the best plants, and grow up soonest; though it may, of course, be often advisable to introduce a few well-grown specimens, of from eight to fifteen feet in height, here and there throughout the plantation, to improve its outline, and give a more immediate effect.

In regard to the Pine and Fir tribe, it is still more indispensable that small plants should be chosen, especially in exposed situations, and, yet more particularly, in the neighbourhood of the sea. From six inches to a foot is the best height for Pines, and from six to eighteen inches for Firs. Larch may be as high as two feet with impunity. But beyond these several heights it is not at all prudent to plant any of this tribe, in any quantity.

The removal of large trees, from twenty to sixty feet high, must be spoken of as a thing that *can* be effected, where particular reasons for desiring it exist. One of such reasons is the placing a very handsome or favourite specimen in a more conspicuous or favourable position. Another is covering and shutting out a disagreeable object in the landscape at once, without having to wait several years. A third case is that in which a park, or park-like meadow, or garden, may be flat, tame, deficient in character or outline. And a fourth object for which large trees may be planted, is where an entirely new place has been formed, and, possessing few or no specimen trees, and being of a flat dull character, such trees may be introduced to break the monotony of young plantations, and give a variety of outline while the younger plants are growing up.

Of this class of trees, it may simply here be said, that if taken up and replanted with great care, having large balls of earth, and being shifted early in the autumn, during suitable weather, and well secured from the action of winds, they will commonly succeed. We would, however, wish strongly to suggest that those about and below thirty feet in height will be almost the only ones that will ever thoroughly recover their natural vigour, and that the more open and unencumbered the position from which they are taken, the better chance will they have of making a speedy and healthy advancement. Not that we would affirm that any great danger exists with respect to trees larger than the size we have indicated. We would merely mention that they usually manifest a feebleness and an unhealthiness which render their use, except under very peculiar circumstances, far from desirable.

For large Birch trees that are to be removed, Horse-chestnuts in some localities, Oaks, and, perhaps, Beech and Hornbeam, some amount of branch-pruning will be requisite, or they will become exhausted, and gradually lose their best branches or perish. As a rule, however, the practice of shortening the branches of large transplanted trees, to any great extent, is highly objectionable; since it keeps a tree disfigured during almost the whole time in which young ones are growing up to the same height, and often spoils its appearance permanently, thus entirely defeating the intention for which it is used.

It may, probably, be worth while here to state that, where very large trees are inserted in plantations in an exposed locality, they will succeed much better if irregularly surrounded by trees about two-thirds their own height, as these serve to break the violence of winds, and to screen the roots from the more powerful of the sun's rays. A remarkable instance of the correctness of this view has recently occurred within our observation.

Already, though somewhat incidentally, it has been remarked that the selection of dull moist weather for planting is of great moment. In the performance of the process, care must likewise be taken to spread out the roots regularly, cutting off the points of those which have been bruised, and shaking the lighter earth over the whole, at the same time moving the plant up and down, so that the soil is gently and closely deposited around the roots. Half the ordinary working gardeners do not give the least attention to these matters; but they are, nevertheless, most essential to the well-doing of the plants. Where the roots are large, or have a ball of earth attached to them, the soil should be pressed closely around and under them by a pointed stick. If planted at a proper season, and in appropriate weather, watering will be wholly unnecessary, even for evergreens. But for large specimens of the latter, a few cans of water may be beneficial to settle the earth about the roots.

Everything, however, in the shape of *puddling* must be always, and in reference to all sorts of plants, completely abjured. Many old experienced gardeners, it is true, still adhere to this custom. But it is exceedingly injurious, and has long since been disused by the more inquiring. It is almost tantamount to planting a tree in a pot or tub, and is even worse than this in some respects.

Where plants employed are so large, or so exposed, that they will not succeed without staking, the chief thing to be observed in effecting this is to put in the stake or stakes before the roots have been covered with soil. The common practice of driving down stakes by the side of a plant after its roots are all covered up, is very injudicious; for there is every likelihood of the stake injuring or even severing some of the best and most important roots, whereas it may easily be put in so as to avoid them while they are all bare.

In all these observations, it will be seen that we have had in view only that planting which is intended to beautify and adorn the more immediate neighbourhood of a house or mansion. Where planting is effected for the sake of the timber alone, the preparation and care which we have suggested will, we believe, seldom be given. But the more nearly *any* system of planting is brought to these recommendations, we are persuaded it will be more successful, and, in the end, more remunerative. From the present time till the end of March, such work as this may safely be performed, and therefore our advice may possibly be serviceable to some. Still, we must repeat, that autumn is, in all respects, the preferable time.

Since this article passed from the writer's hands, the question as to when is the best time for planting has been again before the gardening world, in an aspect which demands a few additional observations. An earlier period than November, and even the month of August, has been recommended as the fittest time for the operation, because the earth is then warmest, and therefore most likely to promote the recovery of the plants from the injuries they have received. But without disputing that a warm earth may be beneficial to newly planted specimens, where the conditions of the atmosphere are likewise suitable, it seems tolerably certain that, when such a favourable atmospheric state cannot be had, warmth at the roots is of little or no value, and might probably be injurious by stimulating the plant unduly; while it is also pretty clear that an element of such doubtful utility as bottom-heat in out-door autumn planting, cannot at all compensate for the absence of those important and essential atmospheric conditions which we have already described as existing in the month of November, but which can very rarely be present at an earlier period. For this reason, then, in brief, we must still consider the time already specified as the most appropriate.

ON THE MANAGEMENT OF FOREST TREES.

By Henry Bailey, Nuneham Park, Oxford.

Of late, those arts which relate to rural economy have made rapid advances, aided materially by the happy union which has been effected between "science and practice." I allude more particularly to the primeval and patriarchal occupations of Horticulture and Agriculture, which have within the last twenty years undergone great changes; old and absurd practices have been discarded, and others adopted more in accordance with those immutable laws, which, the more accurately they are investigated, evince the power, wisdom, and design of an all-wise and beneficent Creator.

Could "the rude forefathers of the hamlet" again revisit this terrestrial scene, what would be their astonishment to see waving crops of golden grain, growing in rich luxuriance on tracts of land, which they had deemed irreclaimable?—to see what they knew only as barren wastes, converted into fertile fields, yielding abundance to the community, profitable investment to the occupier, and permanent employment to the labourer? Or, on the other hand, could those Horticultural worthies of a past age, Mawe, Abercrombie, &c., just take a peep into our forcing-houses and witness the treatment of plants by modern gardeners, so dissimilar to their own (I allude to low night-temperatures)—could they do this, surely their "hair would stand on end," and they would be converts to the opinion of some of our scientific friends, "that seeing" is not always "believing."

There is, however, a twin sister of these arts, whose productions, beautiful, varied and useful as they are, do not secure for her that consideration to which she is so justly entitled—Alas! for poor Sylva! she pines for patronage, her priests are ruthless, and her altars "few and far between," while those of Ceres, Flora, and Pomona, on every hand, are loaded with the offerings of the princely, the noble, and the affluent of the land. Few are the writers since Evelyn, who have dilated upon the advantages to be derived from planting; still fewer are the proprietors who have derived the advantages they might have done if more skill had been exercised in the management of their woods. To attempt to descant upon the usefulness of the Arboricultural art, would be superfluous; it may, however, be remarked, that it is a pursuit which has engaged the attention of the best, the wisest, and greatest of men in all ages of the world.

The cultivation of Trees, then, is still an object worthy of the attention of our great landed proprietors, whether we regard it as having for its ultimatum the purposes of ornament or shelter, or the varied uses to which the products of Trees may be applied; but it is as yet little understood by those whose province it is to practise it—or by the generality of those who are most interested in its efficient performance. Woods and Plantations are but too generally consigned to the care of mere labourers, men who know nothing of the philosophy of their business; who, from long practice, can guess pretty accurately the number of cubic feet in a piece of timber, and tell the value of a standing pole of underwood; but who know nothing of the picturesque beauty of Trees, never heard of vegetable physiology, dreaming that plants absorb food by their roots, or breathe by their leaves, or know that light exercises an important influence on vegetation. Sorry I am to say, that such managers are but too numerous, "their name is legion," and the few exceptions I know are mostly those who, from their education as Gardeners, have learned that plants possess an anatomy as intricate and delicate as that of animals; men who have learned that, if the crowding together of the human species in rooms without sufficient ventilation is deleterious to them, the over thickness of Trees in plantations is equally fatal and suffocating in their case, and who know that it is equally an effort of nature for the stiffled sufferer to be supposed to exclaim, "*Give me air, or I die.*"

Whether we regard the adaptation of Trees to the locality they are to be planted in, the preparation of the soil for them, the planting, the season, or the subsequent attention (or rather want of it) in pruning and thinning—there is much indeed to condemn in general practice, as those who understand the subject must be convinced of when travelling through the country; and how usual is it to see tracts of wet land planted with Larch or other Trees, which grow naturally in dry sandy soils! How often do we see all the refuse of some provincial nursery crammed into narrow holes like stakes, at so much per thousand, without any regard to its future use or effect, or a thought as to what shall be ultimately left to produce timber; or afford, by periodical cuttings, covert for game, or profitable undergrowth ! How often do we see this chaotic mass left untouched for twenty or thirty years, till on some occasion, the keeper or the woodman, finding that "there is nothing to hold the game," sagely tells the proprietor "that it ought to be cut;" the hint is acted upon, it is cut; but *O tempora! O mores!* at one fell swoop, the cold winds are admitted, the etiolated trees are exposed to the full action of intense light, the wind waves their long and ill-balanced stems, the increased amount of light and air cause excessive perspiration, and the roots, injured by the action of the wind, cannot absorb sufficient food for the increased demand. The ill-matured tissue contracts, vegetation languishes, and it is henceforth a region of naked poles and scanty brushwood, by a modern misnomer termed a Plantation.

Painful as is the picture I have drawn, it is not overcharged. What, then, is to be done? Would that the attention of our great landed proprietors could be directed to the importance of the subject; that they would consider how much they lose, how much is lost to the community by committing the care of extensive "woods and forests" to mere "hewers of wood." Happy should I be if, by raising my humble protest against the course pursued, I should be instrumental in leading those into whose hands these remarks may fall, to think seriously on the subject.

Having glanced at the mal-practices which are but too frequently seen, it may naturally be expected that one who has assumed to be (what some may deem) hypercritical, should offer some hints on the proper course to pursue. I will endeavour to do so in a general way, taking for my guide those universally acknowledged principles (*and those only*), which have been sanctioned by scientific investigation, and proved by successful practice. In furtherance of this plan I will consider—

1. What are the requisite qualifications for a forester.
2. The necessity and importance of efficient drainage.
3. The importance of trenching, or well loosening the soil.
4. The season best suited for planting.
5. The manner in which planting should be performed.
6. The adaptation of the kinds of trees to the soil.
7. Pruning.
8. Thinning—for profit and effect.

1st. *What are the Qualifications for an intelligent Forester.*—When we consider the individual beauty and grandeur of Trees, and the important position they occupy in our arts, manufactures, agriculture and commerce, from their collective uses and products, Arboriculture is brought before us in an important point of view. Its value as a science must be apparent; and the necessity for competency on the part of its practitioners is obvious. The manager of woods holds an important post; and, in proportion to his capability, may enhance the beauty and value of an estate to a great extent, or soon inflict upon it irreparable injury. He should possess a mind capable of appreciating beautiful forms, and should understand the principles of the art of landscape gardening, which will enable him to trace the beauty of design, order, fitness, and utility; he will not mar the plan of a great artist by not understanding its object; nor will he, in thinning a mass of wood, leave the marginal Trees in equidistant lines; but while regularity reigns within, on the exterior he will leave here bold projecting masses, there receding glades, and know how to produce artistically that charming intricacy and variety which prevails in natural forests; thus he will combine the production of great picturesque beauty with the production of straight and valuable timber, by giving to each interior tree space and air to ensure its ample and healthy development.

The competent forester then should be a well educated man, well versed in practical, structural, and physiological Botany. He should possess an inquiring mind, and be a keen observer of the phenomena of vegetable life. I seek not to condemn the shrewd, calculating man of business, who values trees only for the cubic feet they contain, the tons of bark, or the number of faggots they yield, but "I would not enter on my list of friends" the man who, to his practical acumen, did not unite the qualifications I have mentioned.

Let not the paltry consideration of an increased amount of salary be a barrier to the employment of the skilful forester as compared with the ignorant labourer. Certain it will be that the small additional investment which secures talent and good management, will yield a per-centage of profit and satisfaction far exceeding the saving of a moderate stipend. Let but there be a demand for such men, and it will create a supply of them; while grateful Sylva will repay with greater beauty and more ample profits the consideration she receives.

2ndly. *The Necessity and Importance of efficient Drainage.*—Drainage is admitted on all hands to be the sure basis of good cultivation. The abstraction of water from the soil (when in excess) facilitates the entrance of air, thereby rendering soluble those substances which the earth contains as food for plants, and which but for such agency would not be available. It also raises the temperature of the soil, and places the trees in a condition to be supplied with food by their roots as soon as their buds feel the invigorating influence of the warm, sunny days of spring. Early growth is of much importance to all trees in a climate so uncertain as that of Britain; by it we secure the full development of the plant under our brightest skies and greatest amount of solar influence, and the consequent ripeness and induration of that growth, while it will have the greatest amount of organizable matter stored up for future development.

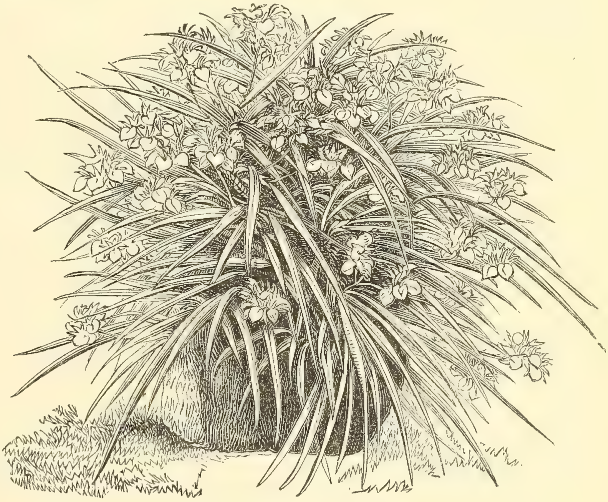
Covered drains are, however, not suitable for woods, because they soon become choked by the tree-roots, which find their way into them in search of moisture, rendering them very soon useless. Open trenches are best suited for this purpose, and their depth, direction, &c., must be regulated by circumstances. Let those who intend to plant regard this as an indispensable provision. The depth of the drains being open, is not material, but would be regulated by the water proceeding from a spring, or being only what is called surface.

MISCELLANEOUS.

New and Rare Plants in Flower. *Achimenes ocellata.* A novel species of Achimenes is flowering in the nursery of Messrs. Rollissons, Tooting, though from the season the full merits of the flower are not developed. The flowers are small, somewhat like A. picta, and of the richest crimson scarlet; they have a dark spot or eye in the centre of each petal, encircled with a white ring. The foliage is of the medium size; dark green on the upper, and stained with red on the under side. With a more favourable opportunity of showing its flowers, we think it will prove a very promising variety.

Barkeria Skinneri Major. Now that the method of cultivating this charming species is more fully understood, it is rarely found out of flower during several months of the year, yielding a large amount of bloom of a delicate yet rich rosy lilac colour, that there is really no wonder the species is so general a favourite. For the still greater appreciation of its value, we mention the fact of a small plant having been in flower upwards of six months, and is still flowering in the Orchideous House of Mrs. Laurence, Ealing Park, Middlesex.

Brassavola nodosa. Our vignette represents a beautiful little specimen which has been flowering for the last two or three months in the gardens of the Horticultural Society, Chiswick, showing that, however insignificant an individual flower may appear by itself, yet when produced in such a mass as here represented, it becomes an object of very considerable beauty.



Bletia verecunda. In the gardens of the Dowager Duchess of Northumberland, Sion House, we observed several specimens of a fine coloured Bletia which Mr. Iveson the gardener supposed to be B. verecunda. As a plant for winter cultivation, it is most useful; it flowers profusely, and does not require any very particular care in management. The scape is between two and three feet long, holding upwards of a dozen large purple flowers on its branches, which we need not state are very serviceable for bouquets.

Cuphea platycentra. An enormous plant of this gay species we noticed sometime since in the nursery of Messrs. Veitch and Son, Exeter. The plant was in a No. 1 pot, most admirably cultivated; so well filled with flower and foliage, that not a break was visible, all equally distributed over the plant. We have never seen a specimen better managed.

Catesbœa parviflora. This old, though interesting little shrub, is flowering in the stove at Messrs. Henderson's, Pine Apple Place, Edgeware Road. The plant was only six or eight inches high, with spreading branches clothed (densely) with small dark green foliage. The flowers are produced at the axils of the leaves, but in such a manner that unless the plant be suspended they are invisible. They are abundantly produced, of the purest white, and deliciously fragrant.

Cattleya quadricolor. A charming species of Cattleya was recently forwarded to us by Mr. Mylam, gardener to S. Rucker, Esq., Wandsworth, Surrey. The habit resembles Lælia Perrinnii more so than any species of Cattleya. The flowers are produced in pairs, a good size, and beautifully coloured though delicate. The expanded portion of the labellum is of the richest crimson, with a margin of pure white; the edges crisped, throat a rich yellow, sepals and petals a delicate rose tint. The edges of the large inner petals are beautifully curled. This is a very handsome species, and will bear comparison with any of the race.

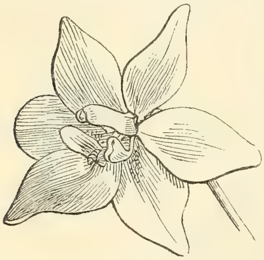
Erica erubescens. We remarked a handsome specimen of the above in flower in the garden of the Horticultural Society, Chiswick. The pure transparent white flowers, the graceful habit of the plant, and the immense profusion with which it blooms, allied to the peculiar season when it was in perfection, was certainly an object of considerable attraction. Would it not be worth the attention of cultivators to have the Heath in several varieties flowering during the winter months instead of the satiety of this species during summer? They would amply repay the cultivator by the enormous quantity of bloom they generally produce.

Inga pulcherrima. A fine specimen of the above we noticed in good flower and most luxuriant growth in the stove of Mrs. Laurence, Ealing Park, where it has been flowering for some time past. We do not remember having seen a more handsome plant of the species before; there was very great merit due to the cultivator, as the plant was in perfection of growth.

Leptotes bicolor. We observed several handsome specimens of this choice Epiphyte in beautiful condition of bloom in the nursery of Messrs. Rollisson, Tooting. The plants could not have been in a better state of cultivation.

Oncidium sphacelatum. A showy kind of Oncidium, with rich yellow flowers spotted with brown, we saw flowering in the Orchideous House of Mrs. Lawrence, Ealing Park. The great merit of the species being the density with which its flowers are placed on the short branches of the scape, the latter being upwards of three feet long, and branched to the base. A similar flowering Oncid we likewise observed in Messrs. Rollisson's collection at Tooting, bearing the name O. Phelpsianum.

Phalænopsis rosea. Our vignette gives the exact size of this flower, which has recently developed itself in the collection of S. Rucker, Esq., Wandsworth. We were, as most of our readers will be, disappointed with the size of the flower, having been informed it would be the size of P. amabilis; otherwise it is very pretty and interesting in colour. The lip is a rich deep rosy lilac, the upper part being a bright yellow, spotted with red, very minutely; the sepals and petals are a pale rose colour. Should the flowers be produced in sufficient quantity to make up for the want of size, it will become a favourite; otherwise it bears no comparison to the superb P. amabilis and P. grandiflora.



Salvia gesnerœflora. Several specimens of this race we remarked coming finely into flower in the gardens of the Dowager Duchess of Northumberland, Sion House. This species is not very generally cultivated, owing to the nature of the plant not being thoroughly understood, particularly its period of flowering, which is during the three first months of the year. Mr. Iveson informed us that the young plants were turned out into the border during summer to allow full scope for growth, and before frost, taken up, potted, and placed in the greenhouse; and during January, when other species of Salvia are going out, this kind commences and continues flowering for two or three months. The flowers are long, a bright scarlet, and produced in pendant masses from the ends of the shoots. We take the opportunity of noticing this plant as it may tend to overturn the bad name it possesses, viz. that it will not produce flowers; whereas it is entirely owing to the want of knowledge in the cultivation respecting its natural capabilities.

Selago pistans. A mere weed in its native country, the Cape of Good Hope; but here is certainly a plant of some interest, on account of the very great profusion of small delicate white blossoms which it continues to produce during the months of November and December—a time when anything like a flower is really valuable. The plant most probably requires but the shelter of a cold frame, as we understood the specimen above had been subjected to three or four degrees of frost, without sustaining the slightest check. The plant was introduced by the Horticultural Society, in whose collection we observed it flowering most abundantly.

Bornean Rhododendrons. Perhaps no plants are more gorgeous than the different kinds of Rhododendron; one in particular which Mr. Low named in compliment to Rajah Brooke. Its large heads of flowers are produced in abundance all the year round, and excel in size those of any other known species. They frequently consist of eighteen flowers, which are of all possible hues, from a pale and rich yellow to reddish salmon colour. When the sun shines upon them, these blossoms sparkle with the brilliancy of gold dust. Three other sorts have a fine inflorescence, one is crimson, another red, and a third of a rich tint betwixt these colours.

Bornean Fruits. The fruits of the Indian Islands have long been prized, the Mangosteen (*Garcinia Mangostana*), the Durion (*Durio Zibethinus*), and the Lansah (*Lansium domesticum*) are amongst the best. The first forms a tree three feet high, bearing large and handsome leaves, and a fruit about the size of an apple; its bright crimson skin and snowy pulp have an inviting appearance; the flavour is highly grateful, and the trees bear two crops in the year. The *Durion* tree often attains more than sixty feet in height, and yields fruit four times in the year. To Europeans the peculiar and strong odour of the fruit is often repulsive, and prevents their relishing its rich flavour. When fresh, however, it is agreeable to both taste and smell. To eat it in perfection, it must be plucked from the tree.

The Lansah is, perhaps, the most universally palatable; the fruit is pulpy, aromatic and delicate, and is produced in bunches from the stem and branches of the tree. A small tree of the order Sapotaceæ produces a sweet subacid fruit called *Tampui.* A species of *Nephelium* is plentiful in the woods, it bears a very pleasant small fruit. The varieties of Mango (*Mangifera*), Jambos, and Averrhoa, are all more or less prized, the Baragan, a kind of chesnut, and the Pomegranate are cultivated.

Timber Trees in Borneo. Many and valuable kinds of timber are produced by the magnificent forests. Their botanical characters are little known: some are useful for ship-building; others have a wonderful faculty of resisting the influence of water, the atmosphere, and even the destructive white ants; while others again produce large quantities of vegetable tallow. Charcoal, pot-ash, and pearl-ashes, are yielded by burning the timber of others. Ebony grows in many places, and the rungas is a handsome red wood, capable of receiving a fine polish; generally speaking there are not many sorts of ornamental wood in the island. Several scented kinds are known.

Ivory-nut Palm (Phytelephas macrocarpa). The singular palm which produces the nuts so long known in our turnery shops, and which have constituted an important article of commerce, to be used as ivory for heads of canes, parasols, umbrellas, and ornamental boxes, has lately been introduced to the Kew Botanical Gardens, through M. Purdie, who discovered it growing abundantly in Columbia, amongst the mountains near the great river *Magdalena,* where it is called by the natives "*Tagua,*" and the district in which it grows "*Taguage,*" from the name of the tree.

The plant chiefly inhabits dense shady woods, at an elevation of from 1000 to 3000 feet, where the thermometer ranges from 65 to 75 degrees, and where the common European apple tree thrives well and bears abundance of fruit. At the season when the ivory-nut is ripe, the country is scented with its fragrance, and hogs, turkeys, and other wild animals, flock to the place and feast upon it, and of which they appear extremely fond. It is never found growing in the hot plains or level country.

It is a diœcious plant, graceful in aspect, forming a very short stem, and producing fifteen or twenty pinnate leaves, which, when full grown, measure twenty feet long, and are of a light and delicate green. The aspect of both the sexes is much the same, except that the male plant produces a distinct spatha, the female none; or if it does, it is only perfect in an early stage, afterwards torn into shreds. The female flowers and the spatha are produced from the axils of the inner leaves and are recurved outwards.

The extraordinary heads of fruits are seen around the base of the plant (one plant frequently bearing six at a time); the heads resting on the ground, or lodged between the leaves, or on a footstalk so short as to be buried among the bases of the leaves, of which the fibre is extremely tough. Each is composed of three to five, but generally four large nuts, wedged in and firmly knit together, of a roundish, but more or less angled, form, depressed at the top, and then covered with conical or pyramidal woody-fibrous protuberances, from half an inch to an inch or more long; the whole forming a compact mass or dark-coloured head, the form representing the head of a negro, and the fibrous protuberances the coarser hair. The leaves are employed to thatch houses, and the whole of the village of the *Paroquia del Carmina,* and the houses generally in this district, are covered with it.

Enclosing the fresh mature seeds is a yellow, sweet, and oily pulp, which is collected in the proper season (October), and is called "*Pepa del Tagua,*" which is sold by the Indians in Ocana at one real per pound. A spoonful of this with a little sugar and water, makes the celebrated "*Chiche de Tagua,*" said to be the most delicious drink in the country, but it is slightly drastic in its effect.

The male flowers are singular and beautiful. The plant differs from most other palms by having a double spatha. The central column is thickly set with clusters of male flowers, and forms a mass three feet long, and four inches thick. The fragrance is powerful and delicious, beyond that of any other plant.

MACLEANIA PUNCTATA, *Dotted-leaved Macleania.* This beautiful species has distinctly dotted foliage, and in this respect differs from the other members of the genus. It was sent from the Andes of El Equador by Mr. William Lobb, and flowered in the greenhouse of Messrs. Veitch and Son, of Exeter, in November 1848. One or two species of Macleania have been known to us for several years; they have thick fleshy roots, and with their stiff habit of growth, do not appear to be well adapted for cultivation in a pot, but planted out in a warm greenhouse, they would form handsome plants. The soil should consist of loam and peat well mixed, but must not be deep, for it has been observed that the fibres keep near the surface. It should be well drained, so as to permit abundance of water to be given during the season of growth, without the risk of the soil becoming saturated. It may be propagated freely by cuttings placed under a bell-glass with a little bottom heat.—*Bot. Mag.* 4426.

THE CULTIVATION OF ROSES IN POTS. The first thing that should be attended to, is to provide a good heap of soil for the plants to grow in. All like a rich soil, which should be made light for the delicate rooting varieties, and more tenacious for the robust hardy kinds.

To form a light soil, procure one barrowful of seasoned turfy loam, half a barrow of well decomposed stable manure, half a barrow of leaf-mould, and silver sand in proportion to the texture of the loam, which will in no case require more than one-fourth of its own bulk.

The heavy soil may be composed of one barrow of stiff turfy loam, one barrow of night soil that has been mixed with loam and laid by for a year, half a barrow of leaf-mould, or well pulverised manure, and sand as before recommended. The addition of about one-sixth of a barrow of burnt earth will be found to improve both composts. The materials should be thrown together at least three months before required for use, and turned frequently that the integrant parts may become well incorporated, and ripened by exposure to the sun and air. The sieve is unnecessary, for as large pots are principally used, the coarser, in moderation, the soil is, the better will the plants thrive.

Roses intended for growing in pots, may be either on their own roots or on short stems; the tea-scented and Chinese kinds are undoubtedly better in the former way. Roses cultivated to bloom in their natural period cannot be placed in too airy a situation, therefore keep them either plunged or placed on the surface with moss or cinder ashes about the pots, in an open spot in the garden. Whichever way is adopted, two things are to be guarded against—the ingress of worms from the ground, and the egress of roots from the hole at the bottom of the pot. If the roots find their way into the ground, there will be few formed in the pot; and the result will be, a more vigorous, but less perfect, growth; and if the plants are required to be removed at the time of flowering, they will receive a severe check. Both of these occurrences must therefore be prevented, by placing the pots on inverted seed-pans.

The aim throughout the growing season should be to get a few stout well ripened shoots by autumn, —shoots that will bear strong pressure between the finger and thumb, without giving any indication of softness, for it is these which will produce strong and perfect blooms. The way to accomplish this is to place the plants a good distance from each other, and, as the young shoots form, they should be set wide apart, that they may enjoy full sunlight. From the earliest period of growth, it is necessary to look them over occasionally, with the design of encouraging such shoots as maintain the best position, and checking those whose tendency is to exclude others from a fair rate of growth, and destroy the symmetry of the plants. Weak shoots should be cut out, and disbudding practised freely. If two or three eyes burst from the same point, threatening to crowd across each other, a portion should be at once removed.—*Paul's Rose Garden.*

The Bamboo Cane (*Bambusa*). The bamboo is one of those surprising tropical grasses, of which we have no parallel in temperate climes. In Mysore they appear like clustered columns of some enormous and enchanted Gothic cathedral, rising in immense symmetrical clusters, varying in diameter at the base from six feet to twenty or thirty, and even twice that width. For eight or ten feet high, each individual of these clusters preserves a form nearly cylindrical, after which it begins gradually to swell outwards, assuming a graceful curve, and, rising to the height of sixty, eighty, or one hundred feet in the air, the extreme ends become horizontal, or gracefully droop. The clusters stand fifteen or twenty yards from each other; and overhead, the interlacing curves of the extremities constitute a grand natural groined roof. The number of bamboos in each cluster, varies from twenty or thirty to two hundred, and the height from sixty to one hundred feet at the point of intersection of the curves overhead. Most of the bamboos are thicker than a man's thigh, and are clustered so close as to be almost in contact. They then taper off gradually to the extreme end, where the point is not thicker than a quill. The joints are about eighteen inches apart, distinguished by a ring, and a set of small branches eight or ten feet long, which are also divided into joints.

The rapidity of growth is astonishing; in one summer a shoot is said to start up to its whole length; when they first spring out of the ground they are about as thick as a man's wrist, and are highly polished, with extremely hard points, and as no lateral shoots are put out until they have attained their full height, they readily make their way through the thick ramified masses.* In confirmation of this, we may remark that a cane of bamboo in one of the clusters, occupying the south end of Chatsworth large conservatory, was found on measurement, to have arrived in six weeks, at the following extraordinary dimensions. The whole of the growth took place during the two last weeks in August and the month of September, 1846. The height of the cane attained during that period, was 41 feet 11 inches, having 32 joints; the circumference at the base was 8 inches, and at the extremity $1\frac{1}{2}$ inch. The greatest thickness occurred 8 feet 3 inches from the base; it was there 9 inches, and the same thickness extended over four of the joints which were respectively distant from each other as follows: the lowermost of the four 1 foot 4 inches, the second 1 foot $4\frac{3}{4}$ inches, and the third and fourth 1 foot 5 inches. The two longest internodes occurred at 19 feet 8 inches from the ground, and were each 1 foot 6 inches, the cane being in that part 8 inches in circumference; the joints at the base were only 11 inches apart, and were the shortest found on the cane. The temperature was, maximum 87°, minimum 60°.

Bamboos are applied to many useful purposes, both in India, China, and Japan. The tender tops are used to form a pickle; the stems are employed in a great variety of ways, such as making house furniture, cups, tubs, and boxes; also in the construction of dwellings which are sometimes covered with the gigantic leaves of the banana; in making water-pipes, and in the construction of fences. Several kinds of excellent paper are also manufactured from them, especially in China. In ancient times the Chinese connected bamboos together, and burnt the letters into them to form books. The *Chinese touch-paper* is made from a variety of bamboo called *lang*. The young sprouts are cut off early in the summer just as the leaves begin to grow, and when beaten flat, are thrown into a lime pit to steep for a month; they are then taken out, washed clean, dried in the sun, powdered and passed through a sieve. By the addition of clean water to this powder a pulp is made which, when dried, forms the paper. The people in the east of China use bamboos in a tender state; in the west of China paper is made of hemp and linen; in the north the bark of Broussonettia Papyrifera, Common White Mulberry, rattan, straw, and silk. The substance called in India, tabasheer, is procured from the joints.

Vegetation of Ceylon. The species which preponderate in the northern province of Ceylon are different kinds of Acacia, mostly very thorny; the Wood Apple (*Feronia elephantum*), Limonia alta, the Mustard Tree (*Salvadora persica*), Carissa spinarum, Gmelina asiatica, Pleurostylis Wightii, Eugenia bracteata, Elæodendron Roxburghii, Ochna squarrosa, Cassia Fistula, Cassia Roxburghii, and Memecylon tinctorium. These are chiefly shrubs and small trees. The large trees, which are mostly of no great size, are two or three species of Terminalia, Bassia longifolia, the Margosa (*Azedirachta indica*), the Satin Wood (*Chloroxylon Swietenia*), the Ceylon Oak (*Schleichera trijuga*), the Tamarind (*Tamarindus indica*), the Palmyra (*Borassus flabelliformis*), which is particularly abundant on the peninsula of Jaffna, and the far-famed Upas Tree (*Antiaris toxicaria*). The mass of the herbaceous plants belong to the natural orders Scrophulariaceæ, Leguminosæ, Rubiaceæ, and Compositæ.—Gardner in *Journ. Hort. Soc.* iv., 31.

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* Comp. to Bot. Mag.

NEW AND BEAUTIFUL PLANTS FIGURED IN THE BOTANICAL PERIODICALS.

Allamanda Aubletii. The A. grandiflora of the *Mag. of Botany*, xii., 79. A fine species from Brazil. —*Bot. Mag.*, 4411.

Aquilegia leptoceras. From the Rocky Mountains in America. Collected by Mr. Burke ; a beautiful hardy kind, with bluish or ochroleucous flowers.—*Bot. Mag.*, 4407.

Arnebia echioides. A native of Caucasus ; quite hardy ; flowers yellow, and abundantly produced.—*Bot. Mag.*, 4409.

Asclepias Douglassii. One of the finest of the genus ; native of the Rocky Mountains ; discovered by Douglas. A hardy herbaceous plant, with pale reddish-purple flowers.—*Bot. Mag.*, 4413.

Brodiæa californica. Collected in California, by Mr. Hartweg. It is a hardy, bulbous plant, with pale blue flowers, and should be treated like *Scillas.*—*Jour. Hort. Soc.*, iv., 84.

Burtonia villosa. Flowers rosy purple ; the largest of all the species ; plant, a native of Swan River. Collected by Mr. Drummond, and introduced by Messrs. Lucombe, Prince, & Co., of Exeter.—*Bot. Mag.*, 4410.

Cereus Leeanus. A native of Mexico ; flowers deep red, large, and showy. Received by Mr. Lee, of Hammersmith, from France.—*Bot. Mag.*, 4417.

Cirrhopetalum Macraei. A native of Ceylon ; discovered growing on trees, by Mr. M'Rae ; and sent to this country by Mr. Gardner. The flowers are deep yellow, mixed with purplish brown. — *Bot. Mag.*, 4422.

Cirrhopetalum nutans. Introduced by Messrs. Loddiges, from Manilla, through Mr. Cuming. The flowers are yellow, and produced in abundance ; the species, however is not handsome.—*Bot. Mag.*, 4418.

Cyclobothra monophylla. Collected by Mr. Hartweg, upon the Sacramento Mountains, California. A bulbous plant, growing three or four inches high, and quite hardy, and bearing bright yellow flowers. It should be planted in an American border, and remain undisturbed.—*Jour. Hort. Soc.*, iv., 81.

Dipladenia urophylla. A handsome shrub, from the Organ Mountains of Brazil. Introduced by Messrs. Veitch and Son, of Exeter ; and bearing a profusion of rich salmon-coloured flowers.—*Bot. Mag.*, 4414.

Heterotrichum macrodon. A handsome melastomaceous plant, introduced from New Grenada, by Messrs. Vetich. The flowers are white, and produced in terminal corymbs.—*Bot. Mag.*, 4421.

Limnanthes rosea. A hardy annual, found in California, by Mr. Hartweg. The flowers are rose-coloured and rather pretty ; and the habit of the plant prostrate and succulent.—*Jour. Hort. Soc.*, iv., 78.

Miltonia Karwinskii. A beautiful orchid, brought from Mexico, by Count Karwinski. The flowers are produced in a long raceme. The sepals and petals are bright yellow, barred and spotted with brown. The lip is white at the point, deep violet at the base, and bluish in the middle space. The column is nearly white, and adorned with two serrated hatchet-shaped wings.—*Jour. Hort. Soc.*, iv., 83.

Mirbelia Meisneri. From Swan River ; collected by Mr. Drummond, and introduced by Messrs. Lucombe, Pince, and Co. A lovely greenhouse shrub, with purple flowers.—*Bot. Mag.*, 4419.

Passiflora amabilis. Perhaps a hybrid ; received at Kew from Mr. Makoy of Liege. It is a stove plant, and produces solitary deep red flowers, varied with a delicate white crown.—*Bot. Mag.*, 4406.

Pleroma Kunthiana. Nearly equal to P. elegans. The flowers are large, and deep purple ; it was introduced from Brazil through Mr. Gardner.—*Bot. Mag.*, 4412. It is figured in our *Mag. of Botany*, xii. 125.

Jambosa malaccensis. Native of the Malay islands, and cultivated on account of its fruit.—*Bot. Mag.*, 4408. The flowers are deep crimson, and not white, as is usually thought.

Scutellaria macrantha. A perfectly hardy plant, with rich blue flowers, dwarf, and well suited for grouping in the flower garden. It is a native of Eastern Asia.—*Bot. Mag.*, 4420.

Vriesia glaucophylla. A plant not remarkable for beauty ; a native of New Granada, introduced to the Royal Gardens at Kew, through Mr. Purdie.—*Bot. Mag.*, 4415.

CALENDAR OF OPERATIONS FOR MARCH.

The unusual fine and open weather during the month of February, has allowed all kinds of Garden work to be progressed with at a rapid rate. March is the time for sowing most sorts of seeds, and finishing off planting trees and shrubs ; in fact, everything may go on that the weather will permit to be done. It is not improbable but part of the month may prove wet and frosty.

FRUIT AND VEGETABLE DEPARTMENT.

Glass.

Cherry Trees, in pots or tubs, which were placed in heat at the beginning of February, are now in bloom, and should have a free circulation of air, and a moderately brisk but humid heat. Supply the roots with the liquid manure, and give a partial shade from the rays of the sun until the fruit are set.

Cucumbers, in frames or pits, on common dung or leaf beds, will now require earthing up, as towards the end of the month they will begin to bear. Admit the air freely in fine weather, water liberally at the roots, and trim and stop regularly, so that the vines do not become tangled.

Figs. Water with weak liquid manure every other day ; also sprinkle them over head with the syringe pretty often in sunny weather ; in other respects treat them as last month.

Kidney Beans, for succession, may be sown in pots twice this month. They now require abundance of air.

Peach Houses. The fruit being now set, let the thermometer range from 65° to 75° by day, with abundance of air, and about 60° at night.

Pineries. In these structures abundance of fruit will be showing; give a higher temperature than last month. If the plants are grown in the soil without pots, and the bed heated by hot water pipes, the growth will be much finer, and the fruit considerably larger, with scarcely a tithe of the trouble attending their culture in pots with tan.

Potatoes, in frames and pits, should be exposed to the air as much as possible, but they must be well secured by covering from frosts.

Strawberries. Bring into the forcing-house the last crop of Keene's Seedling Strawberries, which will continue bearing until the earliest crops ripen in the open air.

Vineries. Follow the directions given last month.

Open Air.

Apricots and Peach Trees should have their blossom protected from frosts by netting or canvass, the first may remain suspended before the trees until the fruit is well set.

Asparagus. Any time after the middle of the month fork and spring dress the productive beds. This, too, is the best time for forming new beds. Select a piece of good mellow ground for the purpose, dung it well, and trench it to the depth of eighteen inches or two feet; then form beds four feet wide, and make in them three drills lengthwise in the beds, and sow the seeds thinly; cover in each drill, and rake the bed lightly over to level it.

Artichokes. Give the spring dressing with manure towards the end, and dig and level the ground between the plants.

Beans. Sow Hangdown, Longpod, and Windsor, twice during the month. Also plant out those which were previously sown in boxes for the earliest crop.

Beet. Sow the main crop.

Cabbage. Plant out from the winter beds all the strong plants for use in June, and sow the early kinds to come in during the autumn; also sow Brocoli, Borecole, Savoy, and other winter Greens.

Cauliflower Plants, wintered in frames, &c., should be planted out about the end, and sow seeds about the middle of the month.

Carrots. Sow the main crop.

Celery, previously sown on a slight hotbed, should, towards the end, be pricked out in light rich manure soil, and sow in a warm place for a later crop.

Herbs, of various kinds, may now be sown.

Peas. Sow twice in the month.

Parsnips. Sow the main crop.

Potatoes. The sooner the early crops are planted the better.

Onions. Sow the main crop as early in the month as the weather and the soil will permit.

Turnips. Sow the early kinds about the 20th for the first crop, and a succession crop at the end.

Spinach. Sow twice during the month.

Salads. Keep up a succession by sowing every fortnight.

FLOWER DEPARTMENT.

Glass.

Conservatory and Greenhouse. In these structures make slight advances of heat on bright days, but avoid fire as much as possible; admit air freely; train climbers as they advance in growth; pot when requisite; use fibrous rough soil; give good drainage; water newly-potted plants with care, and do not remove them whilst newly watered; attend regularly to watering, and keep everything clean and in good condition.

In the Forcing Pits. Continue to introduce plants to bring into flower in succession. Destroy insects by fumigation or other means, and keep the plants well syringed.

Cold Frames and Pits must have abundance of air. Sow hardy and half-hardy Annuals in pits, and keep them here until the spring frosts are over, when they may be turned out into the borders.

Orchid House. Orchids beginning to grow should be placed at the warm end of the house; attend carefully with watering, a humid atmosphere, and partial shade. Flowering specimens should neither be kept so warm or moist as those which are growing.

Stove Plants, of various kinds, should now be attended to. Climbers should be pruned and trained; the *Lagerstrœmia indica* and other species should now be liberally cut in, and plants beginning to grow should be potted or top-dressed, and a moderate increase of heat supplied.

Open Air.

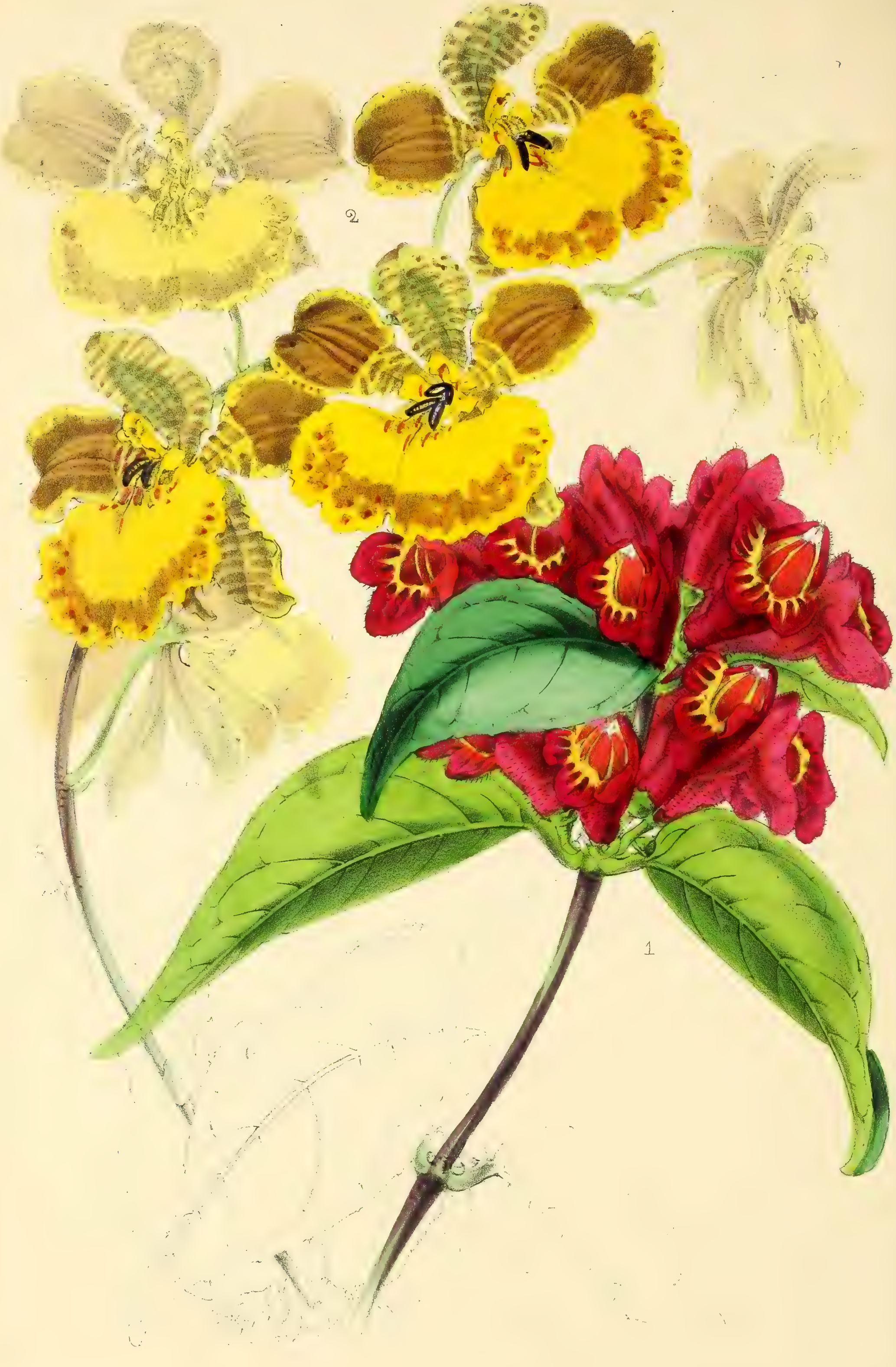
Mowing and dressing Lawns, pruning Roses, preparing flower-beds, and making all progress with alterations before the sun becomes too strong, form the chief business of this month.

FOREST DEPARTMENT.

Thinnings and Prunings should be cleared from the plantations as soon as possible, before growth commences.

Planting must be completed at an early period in the month. In re-planting land where the timber has been felled, avoid planting the same kinds again. If Oak, Elm, Beech, &c., have been previously grown, plant Larch, Scotch Fir, and other pinaceous plants.

Nursery. Sow the seeds of Forest Trees, and begin to get everything in order for the spring.



S. Holden del & Lith.

1 Æschinanthus miniatus.

2 Oncidium flabelliferum.

PAXTON'S

MAGAZINE OF GARDENING AND BOTANY.

ONCIDIUM FLABELLIFERUM. (Fan-lipped Oncid.)

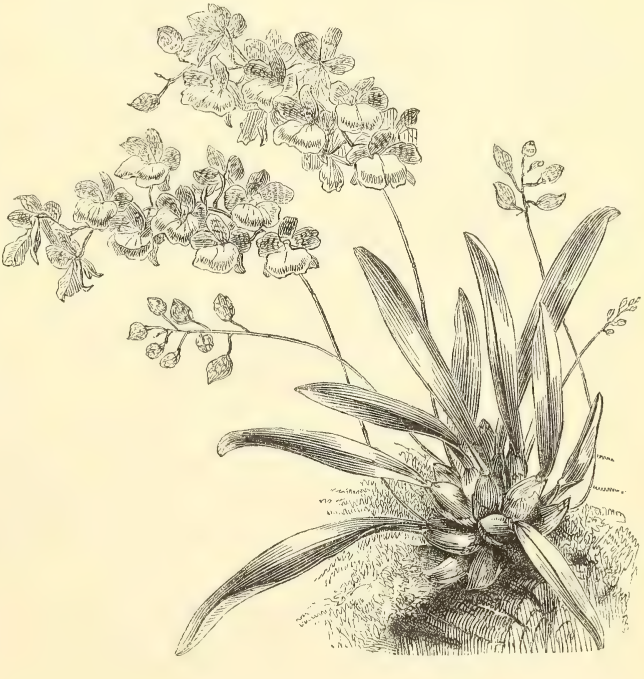
Class, Gynandria.——*Order*, Monandria.——*Nat. Order*, Orchidaceæ.——(Orchids, *Veg. King.*)

Generic Character.—*Perianth* showy. *Sepals* often undulated, lateral ones sometimes connate with the lower part of the labellum. *Petals* similar. *Labellum* very large, spurless, continuous with the column, variously lobed, tubercled or crenulated at the base. *Column* free, semicylindrical, winged at the top on both sides. *Anthers* usually two-celled; *rostellum* sometimes shortened, sometimes elongated and beaked. *Pollen masses* two, furrowed behind; *caudicula* plain; *gland* oblong.

Specific Character.—*Plant* an epiphyte. *Pseudo-bulbs* two inches or more long, having from one to three leaves at the extremity of each. *Leaves* erect, lanceolate. *Flower scape* one foot to eighteen inches long, many-flowered. *Sepals and Petals* ovate-lanceolate, rounded, wavy at the edges, thickly spotted and striped with purplish-brown, much after the manner of the flowers of the O. tigrinum. *Labellum* large, spreading, fan-shaped, curled at the margins, two-lobed, of a bright yellow, thickly spotted on the lower margin with purple brown.

Authorities and Synonymes.—Oncidium flabelliferum, *Pinel's MSS.*

This is without doubt one of the most beautiful of that section of Oncids to which it belongs, not so much on account of the size of the scape and number of flowers, although these are considerable, but chiefly from the large size of each individual flower, the fine tiger striping and spotting of the sepals and petals, and the dimensions, brilliant yellow colour, and singular spotting of the lip; altogether, it is a plant of surpassing excellence.



In some respects the plant resembles a variety of *O. crispum*, but there are several particulars in which it by no means corresponds with that species; in the marking of the flowers, it has a similitude to *O. tigrinum*, but it differs considerably in habit, size of scape, and number of inflorescence; it is evidently distinct from every previously described species, and must be considered as entirely new to our collections.

Our drawing was made some time ago in the Stove of Messrs. Rollisson of Tooting, where it continued in bloom for a considerable time, the admiration of all who saw it.

It is a native of Brazil, and was received in 1846 by Messrs. Rollisson from M. Pinel, a botanist and collector of plants, residing in the Brazils. It was introduced under the name we have adopted, given, no doubt, on account of the *labellum*, resembling a *fan* when spread out.

We see no objection to its retaining the name of *O. flabelliferum*, more particularly when it is considered that it was so named by M. Pinel, who first found it, and who has no doubt described it under that appellation in his unpublished works.

In cultivation it should be potted in turfy heath-mould, mixed with potsherds and chopped sphagnum, filling the pot half full of drainage, and elevating the soil in the pots, in the same manner as for Stanhopeas; or it may be attached to a block.

It requires abundance of heat, water, and humidity, during the season of growth, and to be shaded from the violence of the sun's rays; and in the time of its torpidity, it should be kept nearly dry. Increase is effected in the usual way.

The generic name is derived from *ogkos*, a tumour; the plants belonging to this genus having warts, tumours, or other excrescences at the base of the labellum.

LOBELIA DENSIFLORA. (Dense-flowered Lobelia.)

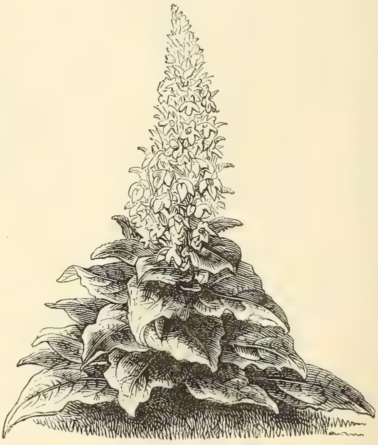
Class, Pentandria.——*Order*, Monogynia.——*Nat. Order*, Lobeliaceæ.——(Lobeliads, *Veg. King.*)

Generic Character.—*Calyx* five-toothed. *Corolla* tubular, irregular, cleft from the top of the tube into long divisions. *Stamens* having the anthers united and bearded. *Style* simple. *Capsule* two-celled.

Specific Character.—*Plant* herbaceous. *Stem* obtusely angular, glaucous, smooth, rising about six inches in height. *Leaves* ovate-oblong, acute, denticulate, wavy at the margins, sessile, glabrous. *Raceme* terminal, leafy, dense, about four inches long. *Corolla* cobalt-blue; two upper segments lanceolate, three lower ones oblong-lanceolate.

Authorities and Synonymes.—Lobelia densiflora, *Mag. Gard. & Bot.* i., t. 67.

Amongst the numerous species of Lobelia known and described, we find no description agreeing with the subject of our present plate, which we observed blooming in the Nursery of Messrs. Knight and Perry, King's Road, Chelsea, in October, 1848, at which time we made our present drawing.

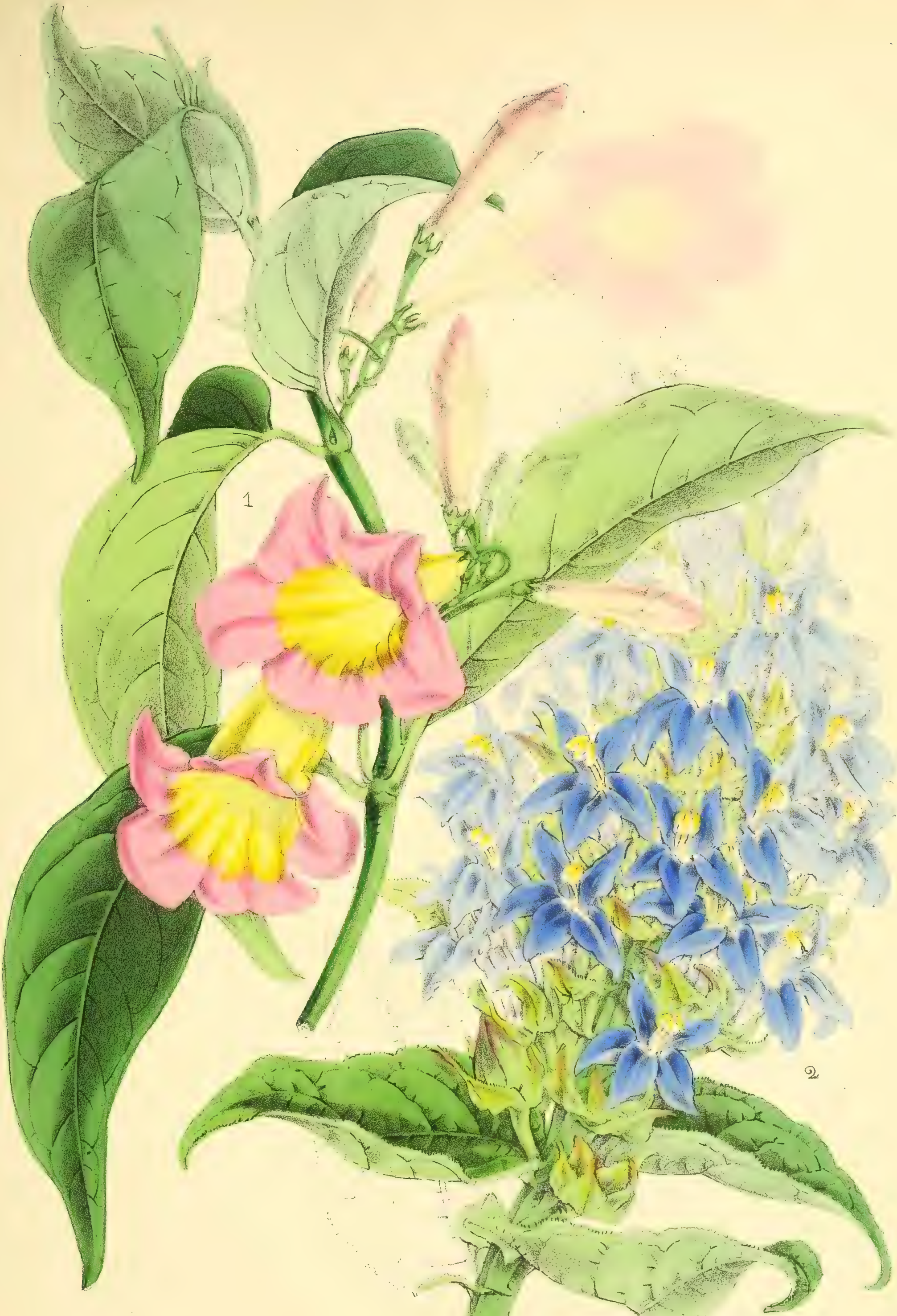


It is a plant of considerable beauty, being very dwarf, seldom exceeding eight inches in height, half of which forms the dense pyramidal spike of intense blue flowers; the lower part of the spike usually measures about two inches in diameter, and tapers to a point at the extremity; the foliage is of a bright and lively green, and not being coarse, it admirably contrasts with the deep blue of the flowers.

The plant is hardy, or nearly so, and if its shoots can be induced to spread along the ground, it will prove an excellent kind for planting in small flower-beds in the open air, being of low growth, and from the colour of the flowers, very conspicuous.

It may be propagated by division of the roots, and should be grown in a light rich soil.

The generic name is given in honour of Mathew Lobel, author of various works, and particularly that called "Icones Plantarum." He was born at Lisle in 1538, became physician and botanist to James I., and died in London in 1616.



S. Holden, del. & Lith.

1 *Dipladenia urophylla?.*
2 *Lobelia densiflora?.*

ÆSCHYNANTHUS MINIATUS. (Vermilion-flowered Æschynanthus.)

Class, Didynamia.——*Order*, Angiospermia.——*Nat. Order*, Gesneriaceæ.——(Gesner-Worts, *Veg. King.*)

Generic Character.—*Calyx* ventricosely tubular, five-cleft. *Corolla* tubular, incurved, with a dilated campanulate throat, and an oblique, sub-labiate limb. *Stamens* four, didynamous, exserted, usually with the rudiment of a fifth; *anthers* at first conniving by pairs; *cells* parallel. *Stigma* excavated, somewhat funnel-shaped. *Capsule* long, siliquose, two-valved, falsely four-celled. *Seeds* small, generally scabrous; from papillæ ending in a bristle-like tail at both ends.

Specific Character.—*Plant* epiphytal, evergreen. *Stems* trailing, slender, rooting at the joints. *Leaves* ovate-oblong, blunt, opposite, obscurely serrated, fleshy, about two inches long. *Petioles* short. *Flowers* in axillary and terminal fascicles, peduncled. *Peduncle* short, single-flowered. *Calyx* tubular, smooth, medium size, green tinged with purple; segments equal, blunt. *Corolla* tubular, wide at the throat, funnel-shaped, swollen at the base, of a rich vermilion red, tinged with yellow in the throat and barred with purple; *limb* divided into four obcordate, spreading segments, upper segment two-lobed. *Stamens* exserted, fastened to the tube of the corolla. *Anthers* joined in two pairs. *Style* one.

Authorities and Synonymes.—Æschynanthus, *Jack.* in *Linn. Trans.*; *Wallich* in *Pl. Rar. Asiat.* Incarvillea, *Roxburgh.* Lysionotus, *Blume.* Æschynanthus miniatus, *Lindl.* in *Bot. Reg.*, xxxii., t. 61. Æschynanthus radicans, *Wallich.* Trichosporum radicans, *Blume.*

Our drawing of this very pretty species of Æschynanthus was made from a specimen which flowered in the stove of Messrs. Veitch and Son, at Exeter, in November, 1847.

It is a native of Java, where it was discovered and sent to those gentlemen by Mr. Thomas Lobb, one of their collectors.

In graceful habit and the production of bloom, perhaps *A. miniata* is fully equal to any other known species, for although the flowers are less in size compared with some, yet their profusion compensates for deficiency in this respect. The plant is easily managed, requiring, like the other kinds, to be grown in a warm, humid atmosphere, either planted in a suspended basket, or fixed to a block of wood in a shaded part of the Orchid house. In such a situation it luxuriates, its slender shoots hanging in festoons of the most brilliant vermilion, relieved by the glossy green of its neat, fleshy foliage.

The generic name is derived from *aischuno*, to be ashamed, and *anthos*, a flower; in allusion to the plants always flowering in shady situations.

DIPLADENIA UROPHYLLA. (Taper-pointed Dipladenia.)

Class, Pentandria.——*Order*, Monogynia.——*Nat. Order*, Apocynaceæ.——(Dogbanes, *Veg. King.*)

Generic Character.—*Mag. Gard. & Bot.* i., t. 4.

Specific Character.—*Plant* a shrub. *Branches* numerous, terete, swollen at the joints, glabrous. *Leaves* opposite, petiolate, ovate-oblong, rounded at the base, and tapering to a long point at the extremity. *Petioles* long, articulated on the swollen part of the joint. *Flowers* in axillary racemes. *Racemes* long, slender, flexuous, drooping. *Pedicels* of irregular lengths, according to their position in the raceme. *Calyx* small, deeply five-lobed; *segments* awl-shaped. *Corolla* tubular, large, showy. *Tube* of a rich brownish yellow in the inside, paler without, and slightly tinged with rose colour; the *lower part* contiguous with the calyx, yellow-green, narrow, and cylindrical; the *upper part* wide and campanulate; *limb* divided into five large spreading obcordate acute segments, of a rich rose colour; *throat* of the richest yellow. *Stamens* shorter than the tube; *filaments* hairy. *Anthers* monadelphous.

Authorities and Synonymes.—Echites urophylla *of the Nurseries.* Dipladenia urophylla, *Hooker* in *Bot. Mag.*, t. 4414.

This fine species forms an upright-growing evergreen bush, without any disposition to climb. The leaves are of a fine deep green, and shining on the upper surface, but paler beneath; and the rich rosy crimson flowers hanging on their slender racemes, are exhibited to great advantage by their contrast with the green foliage.

This is another of the many introductions of Messrs. Veitch and Son, of Exeter, who raised it from seeds collected by Mr. Lobb. The plant was found growing on the Organ Mountains of Brazil, at an elevation which renders the heat of the stove necessary to grow it to perfection.

The habit of this plant being altogether different from that of any other known Dipladenia, we were almost inclined to consider it a member of another genus, but, on examination, it appears to be a true Dipladenia, as that genus is at present constituted.

The cultivation is the same as for the other stove species, viz., during the season of growth and flowering, a good supply of water to the roots, a humid atmosphere, a free circulation of pure air, and a well-drained soil, composed of light loam, heath-mould and sand, are its requisites. It may be increased by cuttings of the half-ripened wood, planted in pots of the same soil, and placed in a gentle bottom heat.

THE TEMPERATURE OF PLANTS, AND OF THE GROUND.

(Continued from Page 39.)

By John Towers, Esq.

We left the subject by an endeavour to prove that heat, applied at the bottom of any vessel, quickly raises the temperature of a volume of water contained therein. Now, to apply this very important truth to the advantage of practical horticulture, we should bear in mind that the ground, at the depth of a very few feet, is warmer during cold weather than it is at the surface, and, therefore, that the natural heat must ascend, and be carried off with the vapour, which—if the subsoil be charged with water—must be formed at its expense. Parkes, in proof, assumes the following position:—"Water," he says, "is a powerful radiator of heat, *i. e.*, it cools quickly. The phenomena of the production of cold by radiation and evaporation are exemplified by exposing water warm enough to give off visible vapour in one saucer, and an equal bulk of water drawn from a well. The former, in a sharp frosty morning, will exhibit ice the sooner; and, again, boiling water thrown on the ground, will freeze more quickly than cold water. The powers of evaporation and radiation combined—and of radiation chiefly—are represented in this experiment by the order of congelation of the two vessels, in point of time; but the difference of heat emitted by each is immense, as appears from reference to the constituent heat of vapour."

Again:—"As the temperature of water in land diminishes according to the varying conditions of the atmosphere, by radiating its heat into the air above its specific gravity increases; and the superficial stratum, which is the first cooled, descends by its augmented density, and is replaced by the warmer and specifically lighter portions from below, which become cool in turn, and successively sink. Thus water, though it does not conduct heat downwards, becomes, when superficially warmed, a ready vehicle of cold in that direction. As, then, excess of water produces cold, those soils only can be exempt from this chilling influence which are not naturally retentive of water, or are secured by having been deeply and adequately drained."

I shall close my trespasses upon Mr. Parkes's able Essay by the following abbreviated extract upon the *depth* and *uniform* action of drains.

"If drains are not deeper than the worked bed, either of field or garden, water will remain in a stagnant state, and, consequently, must chill the roots of plants, and reduce the temperature of the superposed mass of cultivated ground. Gardeners and florists are aware of the injurious influence of water when supplied constantly in a pan instead of upon the surface of the soil, and *bottom water*, as it is sometimes aptly called, produces the same evil consequences, when it stagnates too near the surface of the great agricultural bed.

"Superficial drainage is comparatively of little value, and is, perhaps, exemplified in its worst practical form by land tortured on the ridge and furrow system" (on the notion, as expressed in a note, "that on an undulating surface more stuff would grow than on a plane one").

Open drains are objected to, on the ground that "much of the rain precipitated on the surface necessarily passes into them before it has permeated the whole mass."

I remark here, that wherever the rounded ridge and deep furrow are employed, the latter becomes full of water, as the clay lands were seen to be to a frightful extent in February, March, and April of 1848; and when so, we may be satisfied that drainage is either absent, or in a very defective, inefficient condition.

The subject of draining, thoroughly and to great extent, must be referred chiefly to agriculture; and with that art (or, rather, science as it promises to become) it will not be pertinent to interfere. But as all the light we possess has, till lately, been obtained from that source, it may be proper to take advantage of some practical evidences which will prove exceedingly valuable to those who contemplate the formation and laying out of gardens. Here, then, it will be difficult to appeal to an authority of greater weight than is the "Book of the Farm," by Mr. Stephens, of Edinburgh; and from the first edition of that elaborate work the following passages are taken in an abbreviated form.

First, on the external signs by which existing superfluous water may be detected: it is stated, that to the experienced eye there will be little difficulty; for whatever kind of crop the land may bear, the peculiar state of that crop in those wet parts, when compared with the same where no such water prevails, assists in determining the point in question. Thus, there is a want of vigour in the plants, their hue is not that of health, their parts are not sufficiently developed, the growth of the plants is evidently retarded, and the soil feels non-elastic and "saddened" when trodden on. Such symptoms cannot be mistaken; "they are exhibited more obviously by the grain and green crops than by the sown grasses. In old pastures, the coarse, hard, uninviting appearance of the herbage yields quite sufficient indication of the moistened state of the soil."

In general, I should rather say the SUBSOIL, and then, moreover, that the existence of rushes would be conclusive. Grass lawns may also be cited as offering further evidence, for such can never be kept in that condition of delicate softness of texture and verdant colour which constitute the peculiar beauty of English garden scenery, unless the soil at a considerable depth be perfectly relieved from stagnant water. All clayey districts are liable to this intruder: hence the value of chalk as a subsoil, where, if the stratum be deep, artificial drainage is not at all required. In the Isle of Thanet, I have seen a high degree of verdure persistently maintained, when, after weeks of drought, the clay lands of Kent have been completely scorched; and so, indeed, were the grasses over the gravel of East Surrey, in 1847. Gravel, if deep, demands no artificial assistance, because water flows through that porous medium; for, like a sieve, it holds no moisture; whereas *chalk*, once saturated, acts like a sponge, retaining pertinaciously a sufficiency of moisture, which, through the agency of heat, it yields, by slow degrees, to the roots of the plants that grow, even upon a very thin stratum of mould, deposited upon that absorbent subsoil.

But there are other symptoms of water which may be readily discerned, and to which we would now solicit immediate attention. After the land shall have been ploughed, prior to sowing the spring crops, when the winds of March become keen and drying, large patches or stripes of a deeper colour than that of the general surface are frequently observed, especially, as Mr. Stephens tells us, "in the face or near the top of an acclivity;" but which I have noticed in Berkshire on flat grounds, where the surface of a large plot has become mottled with blots and patches of dark and light hue. In all such cases there can be no mistake: water lurks below, under all the darker spots, although it may not lie stagnant upon the entire surface of the subsoil. Now, setting aside the inevitable mischief which must be incurred in a fine garden, when, after a dripping autumn, the subsoil remains saturated, even so much so as to be found a swamp at a spade's depth, we maintain that a garden can never be trusted, as available for perfect cultivation, if there be but one rod here and there whereon those dark patches are discoverable. They may, and do, vanish in a few weeks, during the continuance of dry weather, under the power of the sun at top, and by the escape of the vapour alluded to by Mr. Parkes, which carries off the heat from below. But the fundamental disease remains uncured, "because it is on account of the water remaining in the soil all winter that the crops receive injury in summer."

A case in point occurs to me at the moment I now put pen to paper; and it accords with another which I had to cope with—in a garden I held in Wiltshire, where, for want of a drain to open into an adjoining ditch, the water stood in a pool at fifteen inches below the surface. Near Croydon, to the east, there is a large field that slopes on three sides, with a considerable fall towards the centre, but particularly towards the south-east, where it terminates in a deep chalk-pit. At the highest side a little pond receives the water that drains from grass fields on its eastern boundary, and the only outlet for the surplus water had long been discharged by a deep furrow which passed between two of the slopes toward the chalk-pit, but where it found no ingress, and consequently overflowed the lowest portion of land, and converted a very large extent of it into a complete bog.

At length the occupier's eyes were opened, and a deep, broad drain was quickly opened, and led in a pretty straight line into the chalk-pit, where, as a natural consequence, a pond is formed, to the great advantage of the land, and nearly an acre of diseased swamp has been drained. Thus that element which was rendered a cause of great injury has been converted into a substantive good.*

The phenomenon of the dark spots in newly moved soil may be explained, as we find it to be in the "Book of the Farm." When the surface of the ground is permeable to water, and rests on beds of different lengths, breadths, and depths, differing also in consistence, the water supplied by the heavens is interrupted in its descent by the retentive substratum, and there becomes accumulated in quantity and extent, according with the form and capacity of that substratum. Thus, where the upper soil is pervious, and the subsoil uniformly retentive, water accumulates on that subsoil, to the injury of plants growing on the surface soil, and numerous drains are required to permit it to pass away. On the contrary, where the soil and subsoil are both porous, the water can pass quickly through them, and no draining is required, because the subsoil constitutes and acts as a universal drain. In the latter instance, dark spottings will never remain visible, for the fresh moved soil will present an uniform tint, however rapidly or slowly the surface may be acted on by the power of the sun.

Depth of tillage and pulverisation form another subject, which need not at this time be investigated.

In this age of inquiry, when persons of science are not contented to observe mere facts, but are bent upon the discovery of causes, I have appealed to the Essay by Mr. Parkes, in which great stress is laid upon the chemical action of heat in converting water into vapour. The practical gardener, who perceives the importance of scientific research, ought to peruse those works which treat of draining, connected with geology. Pure mechanical knowledge of the construction of drains does not grasp a single idea of the chemical agency of sandstone, limestone, or any of the other rock formations upon which the labourable soils repose. Mr. Stephens, in his first edition, to which I am so much indebted, has paved the way for new discoveries. But his second edition is in rapid progress, and to it I hope we may hereafter most profitably refer.

ON VENTILATING HOTHOUSES, AND GLAZING WITH SHEET GLASS.

By Mr. R. Errington, F.H.S., Oulton Park, near Tarporley.

No question has more agitated the horticultural portion of the public, in these later times, than that of the propriety of using sheet glass. For years the gardening world wandered on, content with a murky sort of atmosphere, produced by the unlucky conjunction of inferior glass, small panes, and unwieldy laps; until at last the immense importance of light to vegetation being fully recognized, people began to question the old practices; and the introduction of a much brighter glass took place—brighter, not from its innate clearness alone, but from its size also; whereby the frequency of laps, common to the old practice—are obviated.

It ought to have been easily foreseen that the ventilation question was closely wound up in this; and that, as those aerating apertures were dispensed with, an equivalent ought to be provided. Indeed, if such were not the case, it would not be difficult to prove that, by the old system, houses were over-ventilated: this, however, I hold to be impossible, *maugre* the admission of chilling draughts. These extremes lie at the door of the operator, with whose ignorance we ought not to confound the character of the apparatus provided him. It was to be expected therefore, I say, beforehand, that the sheet glass triumph would not be complete in its first essay; and that prejudices would arise which, in my opinion, will, before long, be fairly grappled with, and I trust dispersed.

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* Scarcely three days elapsed after this paper went to press, ere this noble drain was entirely ruined, and filled up by the fearful hurricane and deluge that occurred on the 28th February. Drainers ought never to leave their work half done: the water course at bottom should be secured by pipes, or other solid materials, without loss of time.

Now it so happens, according to my view of the matter, at least, that the subject of atmospheric moisture is also of necessity woven into this delicate affair.

Intensity of light leads, in the present forms of gardening structures, to a vast accumulation of heat; and these powers, in conjunction, prove so serious a draw on the vital forces of vegetables, that some counterpoise must of necessity be provided, or the remedy (in ordinary language) would prove worse than the disease. The term "flagging" is conventionally known amongst gardeners to express that condition in vegetable existence when the elaborating powers overtake the absorbent ones. If then, I say, this cannot be provided against, better give up the idea of more light; a little time, however, will, as I think, show that this is by no means an insurmountable affair. I take it for granted, then, that a greater amount of atmospheric moisture will, in most cases, be requisite; and, before concluding my remarks, I will endeavour to show how this may be carried out.

Now, as to the much greater intensity of light produced by the British sheet, I would here point to another bearing of the subject;—I mean the use of shades. Persons not well versed in practical gardening may, off-hand, suppose that those who so strongly advocate a brighter glass, and talk of systematic shading, are guilty of a great inconsistency; and, according to the ordinary saying, "blowing hot and cold." Nothing is more natural than to come to this conclusion; but to such I would say, that it is not a greater intensity of light, when the sun shines, that the British gardener desires; but a much greater amount of light under ordinary circumstances; as, for instance, on murky days, or through the winter, when a dulness prevails, which is little better than a twilight as to its effects on vegetation; more especially in the case of early forcing.

This point being once established, another consideration arises or naturally grows out of it: viz., whether it is expedient to use night coverings; and, if so, whether the same material could be made equally applicable to both purposes? This is a somewhat grave consideration, I confess; inasmuch as all these matters lead to some expense in the first outlay: opinions here, then, must be given and received with some caution. As to the use of shades, there can be little doubt that, although with an increased amount of ventilating power, such may not be absolutely indispensable, yet they will be beneficial: and I have little doubt that, with a general adoption of the sheet glass, there will be as general a demand for shading, more especially during one of those very bright and hot summers, which now and then take us somewhat by surprise.

What the result of the experiments may be as to the rough plate glass, I of course cannot say; this is at present undetermined: the utility, however, of canvas or other shades has long been proved, and these we can for the present refer to in the argument. Night coverings have often been recommended by first-rate practitioners, as well as suggested by theory; the argument in favour of their use is, in the first place, that they enable us to descend to a lower night temperature than we otherwise dare, in the present state of horticulture. It appears tolerably evident that, with the internal air in an all but quiescent state, and the capricious interchange occasioned by a cold and of course condensing roof, removed by means of some non-conducting body, that we dare in reality suffer vegetation to rest diurnally, as Nature has planned it in most climes. I have now been considering the matter of night coverings, chiefly as relates to really tropical productions, such as Orchids, Vines under forcing, &c.; it remains to view it in another and most material point.

Drip in houses is well known to be a source of great annoyance; indeed, what comfort is there in a conservatory or show house which is liable to these adventitious showers. In these stirring times, a very considerable portion of the charms of a gardening establishment is owing to a gay conservatory during the dull winter months; when the contrast exhibited between the dormancy of Nature uncontrolled without, and assisted within, creates the most pleasurable sensations, and speaks volumes of the triumphs of modern horticulture. The question then arises, in the course of this argument, can drip be prevented by any known means? and, if so, can it be done without the sacrifice of any material point as to the welfare of the plants? I feel assured it can; and I will proceed with all deference to offer my reasons for so thinking.

It has been urged as an argument against night coverings that they cause plants to "draw," as it is technically termed. Of course, if the night temperature of a Cucumber house is kept in the dead of winter (or indeed in summer even) at a much higher temperature in its relation to the day heat, and to the light, than is necessary, the plants will indeed become "drawn," or long-jointed; especially if the air is devoid of motion, and carrying much atmospheric moisture. But is it fair to say, that this is chargeable on night covering? I can readily believe that a Cucumber house glazed with the sheet glass, in large panes, and possessing a cover on the roof, would endure a temperature of 50° at night without any material damage; but I should hesitate to face a temperature of 55° without the covering. Now if such can be proved, and I hesitate not to affirm that it can, the necessary consequence is, that night coverings are great economisers of fuel; and that in their adoption, having by such a function once covered their first cost, all the fuel saved afterwards becomes clear gain, besides carrying out a great principle; for vegetation in general has no affection for fire-heat; it is merely a necessary evil. Thus much will, I think, tend to show that there is not of necessity *positive harm* in night coverings; I proceed now to show that they are antagonistic to the drip before complained of.

It is well known that the drip in our houses is occasioned by the moisture-loaded air coming in contact with the roof, or cold outside walls; in the main, however, it may be considered as almost entirely originating with the roof. Now, some degree of atmospheric moisture there must be, in all houses, even in the winter conservatory, inasmuch as if no special provision be made for the production of it, such will naturally emanate from the soil in which the plants are growing. A covered roof, therefore, will be found entirely to prevent condensation, provided it never be suffered to freeze; and that some escape for the air-suspended vapour be provided in the back wall, at a high level; and that such escape or ventilator be open all night: this I have long proved to my entire satisfaction.

From the foregoing considerations, therefore, it appears tolerably plain, as I think, that, before long, it will be deemed expedient to fit up the roofs of forcing houses and conservatories, or structures for Orchids, with coverings on rollers, which shall be equally adapted for warding off extreme sun-light, for softening the rigour of severe weather, and for preventing drip in our plant houses.

The expense of such will of necessity be taken into consideration; but if their utility be once admitted, I make no doubt that a rather general demand will soon produce a fabric adapted to the purpose. I have one in use in an Orchid house, which was obtained from Mr. Yexley, of Merton, who, it appears, has endeavoured to meet the growing wants of the gardening public in these things; it cost some four or five pounds for an Orchid house forty feet in length, and is most easily worked on a roller. I have used it both as night covering and as shading; and it appears to answer such purpose with reference to Orchids extremely well, the house being glazed with the sheet glass; it is a lean-to structure.

I would now, in conclusion, beg to offer a few remarks on ventilation, and some other matters, about which both the theoretic and the merely practical horticulturist still differ. Follow Nature, observe both parties; but how can Nature be followed as long as an artificial atmosphere is allowed to be confined for a long night in our forcing houses? The admission of fresh air, night as well as day, is a point which, some seven years since, was scarcely mooted. By degrees, however, the old "coddling system," happily termed so by Dr. Lindley, was broken into, and first-rate practitioners, as well as the amateur, now boldly call for air—fresh air—night as well as day. Is it not time, then, that the lovers of horticulture should make up their mind on this point; and having made it up, to carry out such principles, by providing for a constant renovation of the atmosphere of our hothouses, night as well as day? for Nature does not pause in this matter.

With regard to ventilation, as bearing on the question of sheet glass, there can be no doubt that much of the burning must be attributed to imperfect ventilation—imperfect, at least, as regards the sheet glass.

There has been an increasing desire in later years to accomplish the back ventilation of hothouses by means of clappers or flaps in the back walls. This was certainly a most laudable attempt at progress, inasmuch as the old plan of sliding down the back lights was liable to some serious objections. The glass was very liable to get broken; the lights were liable to get fast, and were, moreover, rather cumbrous affairs to wind up; and, worse than all, they had to be drawn up hastily when a sudden shower occurred. Such, succeeded by as sudden a burst of sunshine, has been the cause, in many instances, of leaf scorching.

These back ventilators or clappers, however, have, in nearly all instances which have come under my notice, been insufficient in point of size to prove a proper equivalent for the sliding light. It has not been sufficiently considered, that hot air lodged in the uppermost angle of the roof will more speedily rush through an opening straight overhead than by a side aperture, which becomes, in the case of a north wind, as much a point of ingress as of egress. If, then, such were inadequate to the purpose with a roof of crown-glass, ventilated by a thousand laps *in addition*, what could be expected in reglazing such roofs with the bright sheet glass, with no extra provision for ventilation? I know a case, within fifty miles of where I write, in which a new range of houses had to be built for a wealthy proprietor: no expense was to be spared to render them complete. The gardener, being jealous of the plans as to their efficiency in point of ventilation, and some other matters (such plans having been concocted by the architect), called on me, in company with the clerk of the works, to ask my opinion. I at once protested against the imperfect ventilation, such being small clappers in the back wall—their incapacity being manifest, at a glimpse, to the merest tyro. I have since found that my advice was set aside, the building gentlemen not considering it weighty enough to disturb the original plan; and I am given to understand, by a proper authority, that during the last summer, at certain periods, the thermometer was much above a hundred degrees, in defiance of every ventilating aperture being wide open, and the very doors of the houses open likewise. The same authority has informed me, also, that the Grapes have actually been coloured at the top of the house, whilst those at the bottom remained quite green. These things ought not to be; they are a serious hindrance to the free progress of horticulture, besides great individual loss.

Before concluding my remarks, I may be permitted perhaps to make a few general observations on the above matters.

To revert to a point about which I offered a few observations previously, viz., atmospheric moisture, I must with deference add, that many forcing or plant-houses are still somewhat deficient in regard of a *permanent* supply. About half a score years since, it was a common affair to talk about steaming the houses, by pouring water on highly heated flues or pipes. This was at one period considered very sound doctrine; but who talks of steaming now?

The great desideratum, it would appear, is a *permanency* of supply, regulated at all times by the demand on the vegetable fabric, through solar light and heat. The only question that remains, if such be admitted, is how it may be produced. Hot steam, it appears, is repudiated. Open tanks are very good things; but when stronger fires are wanted, in order to ward off low temperatures, the amount of hot steam produced, if they be uncovered, is in some cases inconvenient. To be sure, the tanks may be covered; but then another extreme occurs, and we are just in the position that we should have been with the ordinary piping. I may here be permitted to describe a house lately erected here for Orchids, and which appears to answer the purpose admirably. The house is a "lean-to," or roof sloping to the south, forty feet in length by about twelve feet in breadth. A front shelf of open lattice-work runs from one end to the other along the front; this shelf is about thirty inches wide, and much the same height from the floor level. A walk of three feet intervenes between this and the back stage, the lower shelf of which commences at precisely the same height from the ground as the front shelf, and thence to the back wall in the ordinary way. A sunken panel or cavity, of nearly two inches in depth, occurs through the whole area, beneath the front shelf and the back stage respectively. This can be filled with water in ten minutes, and as speedily drawn off by a plug into the house drain. A line of six-inch piping runs from one end to the other at front, under the centre of the front shelf; and another similar line of piping under the centre of the back stage. A portion of this line is composed, at intervals, of Burbidge and Healy's tank, with moveable lids, the rest connecting them round piping, as before observed.

Now, as to ventilation. The roof is glazed with the sheet glass, in large panes, about seven inches wide, by nearly two feet in length, and it is fixed. Clappers, or drop flaps, capable of graduation, are placed in the back wall, under alternate lights, close to the wall-plate; these are eighteen inches long by twelve inches in depth. The front sashes are nearly a yard in depth, and one-half of these drop or slide down three inches, when necessary, after the manner of ordinary house sashes; the other half open outwards from their lower end, with a nicely graduated iron rod. The principal points of ingress for the *cold* and *fresh* air are at the *very lowest* level at front: sliding ventilators are placed along the front wall, and these open immediately on the hot-water piping, which rests on the sunken panel before described as being generally filled with water.

By this arrangement my intention was to give a specific direction to the warmed and moistened air, without being compelled to suffer it to escape by the back ventilator, which, in the growing season, are frequently too great a drain on the atmospheric moisture. The working of these things turns out as I had anticipated; for, by drawing down the front drop-sashes, and at the same time opening the sliding ventilators, at the low level at front, a rotary kind of circulation immediately takes place; a constant current of warm moist air passes over the floor of the house, under the shelves and stages, rises up the back wall, and through the bars of the stage, and returns down the roof to the apertures at the top of the drop-sash in front, where, under certain conditions of atmosphere, a continual current of moist air may be seen pouring forth.

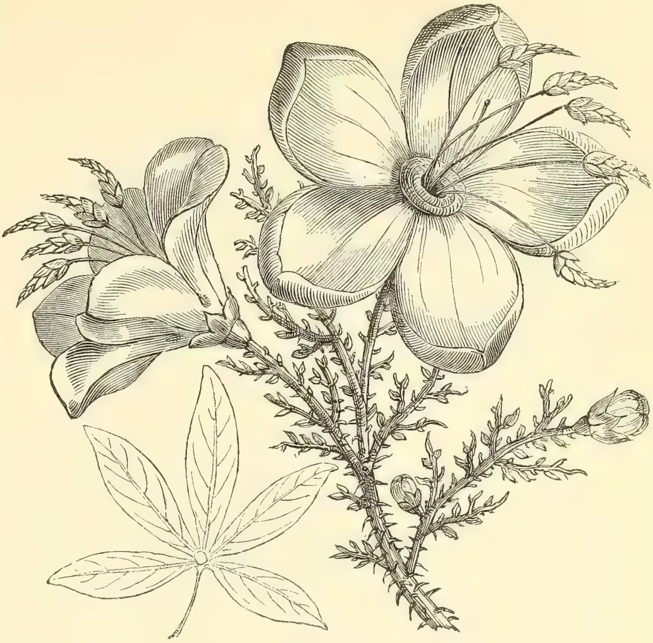
This house has a shading on a roller—the shading material from Mr. Yexley of Merton, as before observed, and this I have used as a night covering through the winter, making a point of maintaining a very moderate fire through the night; seeking a night temperature hitherto of 55° to 60°—a great proportion of the Orchids being the Mexican and Guatemala kinds.

I think the plan of sunken panels beneath the stages and shelves good; and it would be well, according to my opinion, so to arrange the piping, as that one advance pipe above the floor-level should be made, after traversing the house lengthwise, to discharge itself into *two* return-pipes, both lying on the bottom of the sunken panel, and surrounded with water at will, as before described—a constant supply of mild vapour being far preferable to fitful applications of hot steam; especially if a constant motion is maintained in the atmosphere.

ON THE BOMBAX CEIBA, OR COMMON SILK-COTTON TREE OF SOUTH AMERICA AND THE WEST INDIES.

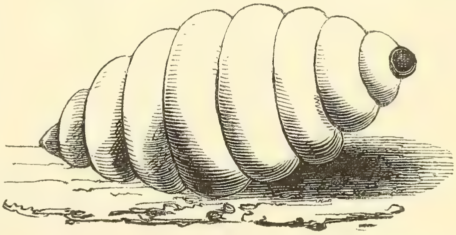
The Silk Cotton Tree (*Bombax Ceiba*) is a native of South America and the West Indies, whence it was introduced to this country about two hundred years ago. As the tree, however, does not flower until it has attained a large size, no specimen that we are aware of has bloomed in this country, except the one growing in Chatsworth large conservatory, which produced only a single flower in November, 1848.

In the extensive forests where this species is a native, it grows to a large size, and forms a noble wide spreading tree, 130 or 150 feet in height; the *trunk* and *branches* are thickly covered with strong sharp prickles. The *bark* is dark brown. *Leaves* alternate, palmate, deciduous; *leaflets* five, occasionally seven. *Petioles* long. *Flowers* large, three inches or more in diameter, of a dull yellow, striped and tinged with dull red, produced singly at the extremities of the young leafless branches. *Calyx* naked, campanulate, truncately five-toothed. *Petals* five, connected at the base with the column of the stamens, each an inch and a half in length, concave; upper surface dull yellow striped with red; under surface, deep brown red. *Stamens* five, monadelphous at the base, free at the top. *Anthers* inserted by the middle, kidney-shaped, having a long tapering point, opening by a transverse chink. *Capsule* large, turbinate, concave at the end, five-celled, five-valved, woody. *Cells* many-seeded. *Seeds* enveloped in a silky cotton.



The genus was founded by Linnæus, the name being derived from *Bombyx,* one of the Greek names for cotton, because the seed-pods of this and other species are filled with a fine soft and silky down, not unlike that produced in the pods of the various species of *Gossypium.* The threads of the *Bombax,* however, differ from those of the true Cotton (*Gossypium*) in being entirely destitute of hooks, so that they cannot be made by spinning to adhere permanently together; the down is therefore never used for clothing, but the poorest inhabitants collect it for the purpose of stuffing cushions, pillows, and beds; but it is generally believed that an effluvium is emitted, which is detrimental to the health of those who sleep upon beds so filled. This tree is the *Bombax aculeatum* of our nurseries and gardens, the *Bombax quinatum* of *Jacq. Amer.* and the *Ceiba* of the natives of South America.

The trees produce very large timber, but the wood is so soft and porous, that it is little esteemed; it is however said to bear exposure to the weather for a considerable time, if after being sawn into boards, it be well saturated with lime-water; it is also cut into laths for roofing houses, is manufactured into bowls and heading for hogsheads; but the chief purpose for which it is used is making canoes, and in many instances the large trunks merely hollowed out answer the purpose admirably. In Columbus's first voyage it was related that a canoe was seen at the Island of Cuba, made of one of these trees, which was ninety-five palms long, of a proportionate width, and capable of holding one hundred and fifty men, and it is stated that the canoes at present made from the *Bombax* in the West Indies are capable of carrying twenty or twenty-five tons.



When the trees become old and decayed, they become the resort of a large handsome insect, usually called the *Macaca Beetle,* which deposits its eggs in the decaying wood; on this the young grubs feed, until they become full grown; they are then as large as a man's thumb, plump, and of a pale ash colour. The natives collect these, and when gutted and fried, they are esteemed even by some Europeans as a great delicacy.

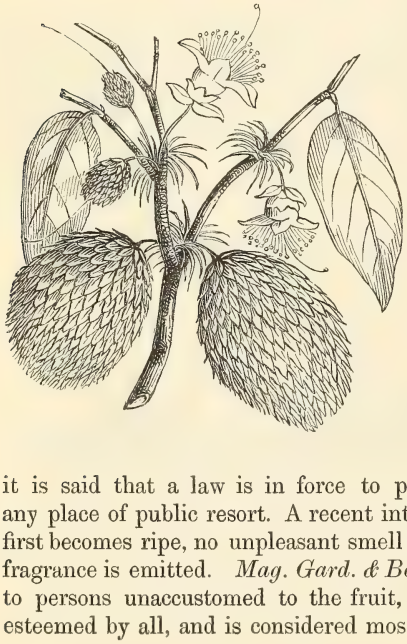
The *Bombax Ceiba,* which flowered at Chatsworth in November, 1848, grows in the border, not far from the centre of the large conservatory, and where the roots are not contiguous to any bottom heat. Although planted out only a few years ago, it has already attained upwards of 40 feet in height, and continues to make rapid advances every year. In November last, when the leaves had all fallen, there hung suspended at the extreme point of one of the young branches what appeared at first to be a bunch of half-decayed leaves, but which on examination proved to be an expanded flower; this although neither handsome nor conspicuous, is yet a very curious and interesting production.

The management of this curious plant is attended with no difficulty whatever, as it will grow with the greatest freedom in any light rich loam; watering freely during the season of growth, and administering sparingly when in a state of rest; but there is one great drawback to its cultivation, and that is, during the period of rest in the end of the autumn and early winter, it is like most other soft-wooded plants, exceedingly liable to become infested with myriads of insects, which, from the number of prickles clothing the stem and branches, it is exceedingly difficult to dislodge or destroy.

Increase is readily effected by cuttings taken from the plant when the wood is half ripe, and planted in pots of fine sand, under a hand-glass, either in a propagating-house, or a hotbed frame.

CULTURE OF THE DURION AS A TABLE FRUIT.

The Durion, or Civet Cat fruit, is the *Durio Zibethinus* of Linn. and other Botanists, and of our Botanical Catalogues. It is a native of the East Indies, and is extensively cultivated in the islands of the Archipelago. In its native country it forms a tree from 60 to 80 feet in height, and with a head spreading in proportion. It was introduced to this country in 1825, but is little known at present in collections, and has not at present flowered or fruited in any collection in Europe.



Description.—The *Plant* forms a tree upwards of 80 feet high. *Branches* numerous, spreading. *Leaves* oblong, acuminate, rounded at the base, resembling in general appearance those of the Cherry; smooth, and green above, silvery beneath, and covered with brownish shining scales. *Petioles* about an inch long. *Peduncles* growing from the ripened wood below the leaves. *Flowers* produced in fascicles. *Calyx* coloured, five-lobed, girded by a two-lobed concave involucrum. *Petals* five, joined together at the base, into a tube, longer than the calyx, with a spreading limb. *Stamens* numerous, disposed in five bundles, each bundle being divided into five, and the filaments with fertile *anthers*, which are anfractuose. *Stigma* roundish. *Fruit* roundish-oblong, as large as a child's head, muricated, with a hard rind, five-celled, *cells* filled with pulp, and four or five-seeded. *Seeds* shining, ovate-oblong.

It belongs to the Natural Order Sterculiaceæ of *Lindley's Veg. King.*, and is stated by travellers to be one of the most delicious fruits of India. The eatable part is the cream-like substance in which the seeds are imbedded; nearly all travellers agree, however, that its smell is exceedingly disagreeable, resembling putrid animal substances or rotten onions; and in Amboyna, it is said that a law is in force to prohibit the inhabitants from throwing the rind in any place of public resort. A recent intelligent writer, however, tells us that when the fruit first becomes ripe, no unpleasant smell is perceptible, but, on the contrary, a very grateful fragrance is emitted. *Mag. Gard. & Bot.*, I. p. 60. Notwithstanding this drawback, which, to persons unaccustomed to the fruit, produces a disgust, yet after a time, it becomes esteemed by all, and is considered most delicious.

The Civet Cat is extremely fond of this fruit, the natives therefore bait their traps with it to catch these creatures; hence the name.

In cultivating the Durion the following directions may be taken notice of. If the plants are grown in pots or tubs, a mixture of two parts light rich turfy loam, and one part peat, sand and rotten manure mixed is the best soil, with good drainage; but if they are turned out into a prepared border, any light rich turfy loam, rendered open by an addition of sand, will answer every purpose.

The temperature during the growing season may average about 70° or 80°, with a very humid atmosphere; in the dry season, from 65° to 70°, with a moderate moisture, and in the season of rest, from 55° to 60°, with a dry and airy situation.

Whilst the plant is in vigorous growth, water, with weak liquid manure, two or three times in the week; and also syringe on fine sunny days, but this last must be continued only during the period of growth.

Supply air liberally when the weather is fine; even during the winter season this is desirable.

Cuttings moderately ripened, will strike root if taken off at a joint, and planted carefully in pots of fine sand, without mutilating their leaves, and placed under a hand-glass in a brisk heat, in the propagating house.

MILTONIA SPECTABILIS PURPUREO-VIOLACEA—PURPLE-VIOLET SHOWY MILTONIA.

This fine new variety, of which we had a drawing prepared in November last, is an *epiphyte*, with a *scape* cylindrical and spreading. *Scales* keeled, cartilaginous, equidistant, obtuse, of a brownish green. *Flowers* solitary, large, purple-violet, very showy. *Sepals* intense purple-violet, oblong, apiculate, somewhat undulated, reflexed at the margin. *Petals* similar in form and colour to the sepals, but broader, and slightly curled at the edges. *Labellum* very large, roundly wedge-shaped, undulated, continuous with the column, pale rose-colour approaching to white at the base, but becoming deeper towards the margin, seven-nerved; *veins* convergent, bowed, coloured, three central ones crested at the base; *crests* entire, truncate, middle one shorter, thicker, more elevate, of a bright yellow mixed with crimson. *Column* of a medium size, erect, compressed, white, gibbous, yellow at the base, and connate with the labellum; *two wings* scymetar-shaped, fleshy, of a brownish purple.

Authorities and Synonymes. This is the Macrochilus Fryanus var., and Miltonia spectabilis Moreliana of some of our nurseries; and the Miltonia spectabilis purpureo-violacea of Hooker, in *Bot. Mag.*, t. 4425.

This beautiful genus was established by Dr. Lindley, who named it in honour of the Earl Fitzwilliam, in whose garden, at Wentworth, Orchids were grown to a degree of perfection which could scarcely be expected at a time when their habits and requirements were very imperfectly understood.

Miltonia differs from Oncidium, in its *lip* being slightly connected with the *column*, much dilated, and undivided; from Odontoglossum, Brassia, and Cyrtochilum in the column being auricled, and the lip not only much larger than the sepals, but altogether different in form.

This is certainly a most elegant variety of *Miltonia spectabilis.* At first sight we were inclined to believe that it was an altogether new species; but on a subsequent examination we found that, with the exception of its colour, all the characters are those of that old and favourite species. The rich purple-violet colour of the flowers gives the plant, when in bloom, a very gay appearance: and the paler colour of the lip, with its bright yellow bars, form a fine relief to the vivid colours of the sepals and petals.

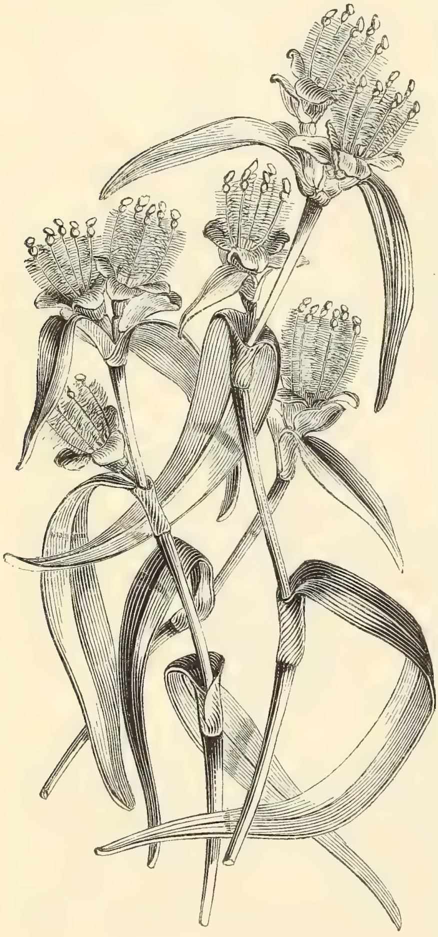
The cultivation of Miltonias is much the same as that given to Oncids; being all natives of the warm parts of Brazil, they delight in a moderately high temperature, and, during the time the plants are in a state of growth, a very humid atmosphere.

They will grow fastened to a block of wood suspended from the roof of the Orchid-house; but they thrive far better if planted in a moderate-sized pot, filled three parts full of broken potsherds, or other drainage, and the remainder with pieces of rough peat, mixed with chopped sphagnum and potsherds. They will not admit of very copious watering at the roots at any time; and during the time of their torpidity they require a considerable degree of drought. The flowers are produced at the close of the autumn, and continue through much of the early winter. During the summer they require well shading from the sun's rays.

Both the present variety, and also the old *Miltonia spectabilis*, have generally a very yellow appearance, which might at first sight be mistaken for sickliness, arising from mismanagement; this colour, however, is not that morbid colour which indicates that the plant is in a state of suffering, but a rich golden yellow, which is too natural to be otherwise than attractive.

Propagation is effected in the usual way.

CYANOTIS AXILLARIS—AXILLARY CYANOTIS.



THE genus *Cyanotis* was founded by Mr. David Don; it is nearly allied to Tradescantia, but differs from it in several important particulars. The name is derived from *kyanos*, blue; and *ous*, *otos*, an ear—from the ear-like form of the segments of the flower.

The perianth consists of a double series, and is six-parted: *outer series*, constituting, what may be called the calyx, is small and persistent; *inner series* tender, coloured equal, clawed, the whole six connate at the base. *Stamens* six, homogeneous; *filaments* loose, slender, and covered with a soft long down or beard. *Style* above dilated, and also bearded like the filaments. *Stigma* tubulose.

The present little species has a fibrous, biennial root. *Stems* numerous, procumbent, rooting from the joints, obtusely-angular, smooth, growing about a foot high. *Leaves* linear-lanceolate, obtuse, slightly villous on the under side. *Involucre* two-leaved, ovate-oblong, acute, lunate. *Flowers* axillary, on short peduncles, solitary, or two together, azure-blue. *Perianth* six-parted, three *outer ones*, slightly rusty, membranous, oval-oblong, acute, equal; *inner* series oval-obtuse, azure-blue, connate at the base, equal. *Stamens* six, fertile, filaments slender, equal, covered with a soft pale blue beard. *Style* shorter than the stamens, and bearded on the upper part like the filaments. *Stigma* simple.

Three species of this pretty genus are known, and have been introduced to this country: the *Cyanotis barbata*, a native of Nepaul, introduced in 1824, and described by Don in his *Prod. Flor. Nepalen.*, 45; *C. cris-*

tata, figured and described in the *Bot. Mag.*, t. 1435, where it is said to have been originally brought to this country in 1770 by M. Richard, who found it growing on the decayed parts of the trunks of old trees, and moist situations, in the Malabar country, and the island of Ceylon; and our present subject, *C. axillaris*, which in point of beauty is very superior to either of the others.

It is by no means a new plant, having been introduced from the East Indies so long ago as 1822; but even to this day it is very rarely to be met with. During the whole of the latter part of the summer and autumn it produces a vast profusion of bright blue flowers from the axils of its narrow, dark green leaves.

With a little care it can be rendered an interesting object; it can easily be made to form a dense bush of any shape. The Messrs. Henderson, at whose establishment we have frequently seen it, and where we had a drawing prepared, recommend young plants as the most serviceable for flowering; old plants are very subject to damp off, and they do not flower so well, being less vigorous.

Increase is effected by cuttings of the young shoots when about half ripe, planted in light soil, and placed in a gentle heat.

ON THE MANAGEMENT OF FOREST TREES.

(Continued from Page 58.)

By Mr. Henry Bailey, Nuneham Park, Oxford.

3rdly. *The Importance of Trenching, and Loosening the Soil.*—In many districts which can only be made available for the growth of forest trees, the steep inclinations of surface, and contiguity of rock, render it impossible to give the soil a thorough preparation by trenching it all over. In such localities, however, the greater the extent and depth of the holes (in moderation) the greater will be the progress of the trees, and *vice versâ*. Trenching or deep digging has long been practised in garden culture, and its advantages observed and appreciated, while (till within a few years) the *rationale* of the practice was ill understood by those who reaped benefit from its adoption. But we live in an age in which science has explained the advantages of deep cultivation, and in which the farmer, as well as the gardener, values it, as the next important step to drainage. In soil which is thoroughly loosened, the roots of all plants penetrate with greater freedom; and not only does this action take place, but rain water passes with facility, and is followed by the air, which performs a most important office in rendering soluble those fragments of various rocks and stones which, from a variety of causes, have become reduced to atoms, and which yield in their decomposition the potash, soda, and other constituents of plants.

Thus the practice of thoroughly loosening the soil yields greater abundance of food for plants, and gives their tender rootlets (spongioles) greater facilities in appropriating it. We say, therefore, let the ground be well trenched wherever the situation will admit of it; but for forest trees avoid the use of manure. The growth consequent upon such preparation will be both rapid and vigorous, in consequence of the abundant supply of prepared food. And here let me call attention to the important agency of light in digesting this supply presented. The value of timber depends greatly upon its density, and it must ever be borne in mind that the means of assimilating an abundant supply of food depend upon a full exposure to the all-powerful action of solar light. In its absence the leaves of trees cease to perform their important functions; organisable matter is not generated, but elongation takes place. It is, therefore, necessary to thin early and progressively, in order to turn to the best account the increased supply of food which is afforded by a thorough preparation of the soil.

4thly. *Considerations as to the most Proper Season for Planting Forest Trees.*—Many and diverse have been the seasons recommended for planting trees, because, with great care, and under favourable conditions, success has in many cases attended the most opposite practices. Some have moved trees when in full leaf, and others during the rigour of intense frost; such are rather to be viewed as exceptions to the rule : but how often has the person, who has accomplished a feat of this kind, dogmatically insisted upon his course being the only right one ; and how often have those who have attempted to follow out a similar method, failed from untoward circumstances of season, &c.

There can be no doubt but that the autumn months are those in which success is most certain to attend the planter, on all soils which are moderately mellow and dry. The sooner after the leaves have performed their functions the better ; say, the beginning of November for deciduous trees, and October for evergreens. This period of the year is confirmed as the best for the following reasons :—The accumulated warmth of the earth still remains in sufficient quantity to gently stimulate the roots to action, and form granulated processes, which ultimately generate rootlets wherever injury has occurred; during these months the air is almost saturated with moisture, and there is, therefore, but a small drain on the scanty resources of the removed tree, as compared with one planted in the spring, when the earth is colder, and the influence of the prevailing winds desiccating and withering to the tender tissues of incipient vegetation.

We cannot too strongly urge our readers to keep in view these important facts, for such they are ; and we assure them that we are convinced, from a long course of practice, that all other seasons are comparatively ineligible as compared with the autumnal months.

5thly. *The Manner in which Planting should be Performed.*—That many of our hardy trees are very tenacious of life, and are capable of enduring very rough treatment, and even succeed under the most untoward circumstances, is not to be disputed ; but this must rather be regarded as an exception than as affecting general principles of culture. The roots of trees to be transplanted should receive the least possible amount of injury in removal, as their extreme points are of the greatest importance. In planting them, after cutting off the injured parts, the roots should be carefully spread out in the position which Nature destined for them, the horizontal ones near the surface; and where it is thought proper to retain the tap-root a small hole should be made for its vertical insertion. We know that many insist upon the necessity of preserving this main root in the Oak ; and for that reason it is frequently raised from acorns ; but we have seen splendid woods of Oaks, of some centuries' standing, in which tablets are preserved stating that they *were planted.* Life is too brief for personal experiment in this case, but probability is in favour of the opinion that those monarchs of our ancient forests which are still extant, were raised from chance seeds ; be this, however, as it may, we regard the preservation of this organ as very important in giving support to heavy-topped trees, such as the Pinaster and its allies. The ground should be moderately dry for this operation, but a humid atmosphere should prevail. In dry harsh weather, the excessive perspiration has a very injurious effect on newly planted trees.

Planting too deeply is a most common and prevalent error, the stem of the tree is thrust into a hole, and the soil compressed round it, to give it stability ; but Nature has assigned to the roots, the stem, the branches, and the leaves, distinct and peculiar functions, and when man covers up the stem with earth, he is thwarting her wise intentions, instead of aiding and assisting her processes.

6thly. *Adaptation of the Trees to the Soil.*—To plant, in its common acceptation, is merely to carelessly thrust into the soil a number of trees, without any consideration as to their future utility or effect, or their fitness to thrive in the situations in which they are placed. We have frequently seen Oaks planted in dry, sandy soil, where the Larch grows admirably ; and we have, after a course of years, seen the finest Larches cut down (being then worth treble the value of the Oaks), and this, because the ignorant woodman has a most national feeling of veneration for this valuable tree, and supposes that at some indefinite period these will be Oaks. This may serve to show, in its proper light, the importance of well considering, at first planting, whether the kinds of trees about to be introduced are such as will prove most profitable, in a given soil, in any certain number of years. It would exceed the limits of this article to attempt to specify the trees best suited for the various soils of this country; but we advise those who are going to plant, to observe well the kinds which succeed best in their immediate locality. For want of this caution thousands of acres which might, by judicious management, have yielded ample profits, are now comparatively worthless. Instances are not wanting of lands planted by contract in the most indiscriminate and reckless manner; no policy can be worse, and no system more to be deprecated.

7thly. *Pruning Forest Trees.*—Pruning is a most important operation of culture, having for its object the concentration of those energies which are inherent in plants, and their appropriation for some specific purpose. The object of the gardener is generally to produce the greatest amount of fruit-bearing wood in his trees; but that of the forester is to obtain a straight clean stem, capable of yielding a considerable amount of available timber. When we consider the important functions which are performed by the leaves, it must be obvious that (to confer the greatest benefit) pruning must be a progressive operation, as any sudden and severe denudation of the branches would destroy the balance between them and the roots. We would be emphatic upon pruning, in contradistinction to what is generally practised, which we designate rather as lopping—for such it is—when branches of one or more inches in diameter are chopped off by an axe, leaving a stump which dies, and ever remains a defect in the timber.

We would recommend that all pruning should take place during the earlier years of growth, by the removal of a tier or two of branches in each season, *with a sharp knife, in the spring of the year;* such slight wounds will soon be covered with bark, and leave no blemish in the wood, In addition to this, those side branches which are getting an undue ascendancy should have their extremities foreshortened. This, coupled with the removal of the weaker trees, so as to give light and air to every individual plant, will ensure results very different to what we commonly see.

Whether we look to the garden, the farm, or the forest management, we find that nothing is gained by overcrowding the shoots and foliage of plants; the battle is to the strong, but the weak perish. We would, therefore, make a rule of thinning the shoots of wood produced from stoolings for undergrowth, removing the smaller ones, and giving additional strength to those retained.

Much mischief accrues to underwood from the prevalent custom of selling it in standing growth; the consequences of which are, frequently, that it is cut by persons who use bad tools, and do not understand what they are doing; jagged cuts are made, and the stoolings are not properly cut down. In consequence, they frequently become rotten, and every year produces a weaker growth.

The best way to treat these high and neglected stoolings is to cut them over with a cross-cut saw, smoothing the cuts afterwards with the axe. It would surely be better that the forester should superintend the cutting himself, having it done in a workmanlike and proper manner, and that the wood so cut should be afterwards sold in lots.

8thly. *Thinning.*—This, as we have before remarked, is an operation which in almost all cases (if practised at all) is deferred too long. There is, perhaps, no more beautiful and striking instance of the orderly design, wisdom, and goodness of an all-pervading Providence than is evinced in the nice adjustment of the balance between the animal and vegetable kingdom. Under the action of light, plants decompose carbonic acid, giving off the oxygen, and appropriating the carbon to the formation of their various products; while, on the other hand, oxygen is necessary to support the animal, who gives out in his turn the carbonic acid. But in dense shade and darkness this action of the leaves of plants is reversed, and no new solid matter is added to the system; elongation and not growth takes place, the cellular system is distended, but with the crude sap. If such, then, are the incontrovertible laws which govern the growth of plants and trees, how erroneous, how empirical is the mode in which woods are managed!

It is not necessary to lay down rules with mathematical precision as to the distances at which trees should be left. Suffice it to say, that throughout the whole course of their progress, to ensure the healthy performance of the very important processes of respiration, perspiration and digestion, they must be so placed as to be fully exposed to the action of solar light; and this object can only be attained by commencing to thin early, and continuing to do so progressively. While, in the interior of a wood, it will be proper to give every tree an equal share of light and air, those circumstances which contribute to give beauty to its outline must not be lost sight of by the forester who would make the most of his profession and the trust confided to him. Beautiful groups are formed by three or four trees in juxtaposition, by Oaks and Thorns, and by groups of various sizes of the latter. We would lay great stress upon attention to this subject, for want of which that which might be rendered perfectly picturesque, is too frequently harsh and monotonous.

It is hoped that these remarks may be the means of causing some reflection on the subject, which may lead to better and more philosophical practice. The present age is characterised by *increased* and *increasing good taste.* It is not now thought sufficient that those things which we employ in our daily requirements should be only useful; but refined civilisation demands that they must be artistically and beautifully designed, and emblematically embellished. May arboriculture keep pace with our other improvements; and while we have societies for the improvement of farming and gardening, may the art of cultivating and giving effect to wood emerge from its obscurity, and take rank with these improved pursuits!

ON FORMING AND TREATING HOME PLANTATIONS.

By Mr. Kemp, Birkenhead Park.

Nothing can be more unsatisfactory to a person of taste, in travelling through almost any part of our country, than the manner in which plantations in immediate connexion with the mansions and parks of the wealthy are arranged and treated. Long narrow strips, of nearly regular outline, or large lumpish masses, wanting all kind of connexion, might be the stereotyped descriptions of the planting on a large majority of our gentlemen's estates. Much of that striking beauty which results from the soft transition of lines into each other, the intermixture of light and shade, the liberal introduction of more or less distant prospects, and that general intricacy of arrangement which not merely conduces to constant variety and interest, but to far greater apparent extent, is thus commonly sacrificed.

It may be worth while, then, to point out, with a view not only to the improvement of particular estates, but to the increased attractiveness of the country's general aspect, what are some of the objectionable modes of disposing plantations, and how they may be so treated as to make them objects of the greatest interest in themselves, and highly contributive to the general effect of a landscape.

One of the most important questions in the treatment of all plantations of an ornamental character, is their outlines. It is almost impossible for any plantation to produce its full and characteristic effect, unless its form bear some decided agreement with the shape of the ground, and the position in which it is placed with respect to other objects. A long plantation, for example, traversing a highly undulated surface, and filling up the hollows with a growth uniform in height and character to that which clothes the hills, would be manifestly destructive of the most beautiful feature in the landscape. Whereas, if the hills or swells only were planted, the trees extending irregularly down the slopes; and, where really necessary for any purpose, the hollows being planted merely with bushes or plants of a lower growth, and these scattered about in broken groups, the undulation would still be preserved, and even heightened.

If, again, a line of plantation, on a comparatively level surface, were continued so as to exclude interesting scenes or objects from the house, or most prominent points of view, this would be clearly erroneous; and the removal of such parts of it as would introduce effectively the more beautiful features it conceals, would serve as much to produce variety and beauty, by letting in light on the glade thus opened, as by bringing in the new and delightful scenery beyond.

But, apart from the desirableness of adapting the forms of plantations to the varying surface of the ground, and to the concealment or agreeable exhibition of distant objects, it is essential that every group should be considered *separately*, and their outlines be determined in reference to their own effect, as well as in relation to other features. A plantation may or may not be beautiful *in itself;* and while, in arranging the general plan of an estate, each mass should be made to unite harmoniously with the whole, its individual character must never be lost sight of, as it is chiefly by attending to the beauty of the parts, that a beautiful whole can be realised.

The first point to be attained in ornamental planting, after the position of the mass has been fixed upon, is to make its outline as *irregular* as possible. Variety of outline is the very essence of beauty in a plantation. Anything approaching to straight lines, either in the form of a group, or in the disposition of the trees in it, is quite fatal to beauty. Circles, also, or any regular figures, are alike to be deprecated, unless where it is intended ultimately to thin out the trees very much along their margins, so as to break the regularity of the line. And even in this case it is better to give the group something approaching to its ultimate shape in the first instance; for, during the time of its growth, it will always have a stiff and unsightly appearance.

It is not, of course, pretended that small plantations, with a regular outline, may not, by some accident, or in some particular aspect, produce a fine effect. All that is here attempted, or will hereafter be aimed at, is to lay down something like *general* rules.

Although, however, diversity of outline in plantations is so exceedingly important, anything abrupt or rugged is, except in peculiar localities of a wild or very picturesque character, to be specially avoided. Smoothness, and roundness, and easy flowing transitions, constitute the charm of home plantations. The lines should, therefore, be in soft gentle sweeps, with more or less of occasional boldness, to relieve them of any tendency to tameness and monotony. But still, even in these projecting parts, the same easiness of curve should be observed.

Hitherto, the exterior or ground outline only of plantations has been considered. The surface or horizontal line which the upper branches compose must now be mentioned. And this, which may for convenience be called the *sky* outline, is perhaps of more consequence than that already discussed. Where this fringe of plantation comes between the eye and the sky—as it always does from some point or other, unless the group be in a very low hollow or dell—the beauty or ugliness of its outline is more immediately perceptible, and continues to attract more attention, than is ever the case with the ground line. To render that agreeable, therefore, should be a prime object with the planter.

Where only a very small group is concerned, its sky outline must be left to Nature or to judicious thinning. Still, even here, perhaps, the placing some of the trees at a greater distance than others, and varying the sorts, will produce considerable change and freshness of form. But, in larger masses, especially where they are of any considerable length, and the ground is at all varied, the best and most marked results may be secured, by interspersing trees of lower growth and bushes irregularly among the larger kinds, and taking care, in thinning, to leave such lower-growing sorts as part of the permanent material of the mass. This, in fact, is the only way in which lines of plantation that are necessarily prolonged can be rendered otherwise than insipid and displeasing, especially if they are on elevated ground.

In regard to the proper size for plantations which are made for ornament on a tolerably large estate, it may be observed, that the nearer they are to the house the smaller they should be, because, by the laws of perspective, the closer an object is placed to the observer the larger is the extent of distant prospect which it covers. Hence, when it is not desired to shut out much of the remoter scenery, the park or home plantations should never be large. In proportion, however, as they recede from the house, the plantations should become broader and bolder in their outlines, that they may have a more massive and imposing effect, and not appear too much frittered away. The view of a fine ample wood on the slope and summit of a bold distant hill or range of hills, when there are good specimen trees and small groups in the foreground, and larger irregular masses in the middle distance, is one of the noblest things in English scenery.

A very common circumstance in the country around an English mansion is for the ground to fall away immediately in its neighbourhood into some valley, often threaded by a river or stream, from which again the land rises into a range of low hills; these, in some instances, constituting the horizon of the proprietor, or, in others, merely forming a middle distance, with higher hills far beyond. Such an arrangement of the surface affords the best possible opportunities for planting it effectively, as nothing sets off single trees and groups so much as being situated on the slope of a hill, where they can be viewed across a valley from an opposite and slightly lower elevation; while the low hills in the middle distance give the means of so arranging groups of plantation as to shut out all disagreeable distant objects, introduce beautiful remote views most favourably, and produce an excellent sky outline.

And yet how rarely is such a middle distance treated at all appropriately! It is most generally found clothed with a long and scarcely varied line of plantation, completely bounding the view from the mansion, or broken into but very partially, and at very distant intervals, the intermediate masses being left to form their outlines, both upper and lower, in the tamest and most monotonous manner. Indeed, this line of hills, thus clothed, has all the sameness, the exclusiveness, and the deformity of what has been very properly termed a *belt.*

Belts of plantation, unless where absolutely indispensable, are in the highest degree opposed to the true principles of landscape beauty; and a case can hardly be conceived in which there is positively no part of the scenery around an estate which could be looked upon with pleasure, and which must, consequently, all be shut out. And where a domain is so circumscribed, that a plantation is really necessary round a great part of its boundary, this plantation should be made as changing and irregular as possible, as well—in the way before suggested—by planting in it trees and shrubs of very varying heights and habits, as by giving a somewhat freer play to its outline, and carrying its salient points out by groups of specimen trees placed on the grass.

The true principle on which all home plantations should be formed, where the extent of the place and the nature of the outlying country will admit of it, is that of throwing them into masses or groups, varying in size from a few trees to a quarter or half an acre, or even, when sufficiently far from the house, of a full acre, with an outline that shall be pleasing from all sides, but particularly towards the mansion. The word *masses* best expresses the meaning intended to be conveyed in reference to the larger plantations, because it indicates denseness and breadth, in contradistinction to the narrowness, thinness, and length, which have been before repudiated.

In mentioning *groups* it may be remarked, that this phrase applies to assemblages of from three to twelve, or more, trees, very irregularly placed, and finished off, in particular parts, with single specimens, so as to connect them with other and more scattered specimens, and with the larger masses. In disposing of these groups and single trees about a park or large lawn, one of the chief objects is to give connection to the whole. They should not stand about like so many isolated spots, of greater or less breadth, but be so nicely arranged that, without at all shaping themselves into lines, or too much breaking up the broad sunny glades of grass, or giving the appearance of artificial connection, they may yet insensibly unite with each other. This beautiful result—the last perfection in landscape gardening—cannot well be accomplished in the park without the use of low thorns and other bushes, Junipers, Yews, Hollies, and even masses of Furze, Broom, &c.

That groups of trees may produce particular and marked effects, and that plantations or masses also may be alike varied, in addition to that diversity of form and tint which may be obtained by an ordinary or special mixtures of sorts, it is a good plan to plant a number of trees of one kind together, here and there. This gives greater roundness and symmetry to certain groups, or parts of a plantation, and likewise yields striking results in the way of masses of one peculiar form or colour. Where the sorts thus chosen are evergreens, the effects are more manifest. A group of Scotch Firs on the summit of a low hill or swell, is, when they are old enough to have acquired all their picturesqueness, a splendid object; and a mass of Larch or Spruce, also, with their spiry tops, may sometimes, in similar positions, be exceedingly effective. The use of the Lombardy Poplar for such purposes, in plantations, will be more familiar. But round-headed trees, such as Beech and Lime, and the elegant feathery forms of the weeping Birch, will, when planted in masses by themselves, blend into the most exquisite combinations, and curve gracefully down at the points, so as to produce a charming softness of outline. Oaks, too, especially when they become aged, form the most picturesque groups; and Cedars and Yews, if placed on the slope of a hill, so that their dark foliage is backed by broken ground, or grass, have a very noble appearance in masses.

With respect to the sky outline of plantations, there is one aspect in which it still remains to be considered, and this is of peculiar interest. Any one accustomed to watch the effects of a fading twilight and setting sun on whatever objects come between the spectator and the west, or, in short, whatever forms the spectator's western horizon, must have noticed that even the most ordinary beauty of outline is converted by this tender light into something quite exquisite, while a highly beautiful and picturesque arrangement is rendered really enchanting.

To take advantage of this circumstance, and throw the various forms of plantation which occur on the western horizon of an estate, as viewed from the house, into the most varied and pleasing assemblages possible, so that the softest undulation of outline may prevail throughout, should be one of the principal aims of the planter or improver.

Nor must the effect of the shadows which these trees and groups throw when the sun is nearing the western horizon, be at all neglected. By having the front as well as the surface line of the masses gently broken, with occasional single specimens standing forward, the finest variations of shadow may be obtained; and, to a mind which revels in natural beauties, the gradual extension of this beautiful line of shadows, as twilight advances, will be a subject of frequent and delightful contemplation.

A consideration of the treatment of an old estate, where the plantations actually exist, may possibly form the subject of another paper; the arrangement of young plantations, with a view to future effects, having engrossed all the space at present allotted to this topic.

NOTES RELATING TO THE HISTORY, DISTRIBUTION, AND CULTIVATION OF THE PÆONY IN CHINA AND JAPAN.

Translated from Original Chinese Works, into Dutch, by D. I. Hoffman, of Leyden; and again translated from the Dutch, by Mr. Polman Mooy, of Haarlem.

[JOHN DICKSON has much pleasure in laying before the readers of "The Magazine of Gardening and Botany," the following interesting particulars on the cultivation of the Pæony, placed at his command by the kindness of his talented and respected friend, Mr. Polman Mooy, of Haarlem.]

HISTORY AND DISTRIBUTION OF THE PÆONY IN CHINA.

THE Chinese distinguish the common Pæony from the improved sorts, and grow both, the common one for the use of the roots, which are considered to contain powerful medicinal properties; the latter for the charming beauty of their flowers.

The common sort is known in China by the name of *Sho yo*,[*] and the improved sorts by the name of *Mow tân*[†] or *Muh tân*.[‡]

[*] 芍藥 [†] 牡丹 [‡] 木丹

The communications relating to the two sorts given by the Chinese Naturalist Le she chin, in his work "*Pèntsaou Kang muh*," (published in 1596), is not uninteresting.

The following is an extract of what he states upon the subject:—

"The name *Sho yo*,* given to the common sort, signifies 'most beautiful,' which name, without doubt, it really deserves; this sort serves in its native country for a Forget-me-not, which one friend presents to another when called to separate from each other. A *Sho yo* plant is received for a friendly remembrance after separation, which custom has created a Chinese song, saying—

> "'Will any one rejoice his friend with a present,
> Of course he gives the most beautiful of all;'

and it has also given occasion to its name *Le tsaoù*, 'a plant to take leave with.'"

The improved sort bears the name of *Mow tân*, "male scarlet flower," in consequence of its propagation (although occasionally from fruit and seeds) being principally effected by dividing the roots; and it got its name of scarlet flower, on account of the scarlet-coloured sort being considered the principal one.

The *Mow tân* flower resembles the so-called "most beautiful," of which the stems are hard-wooded and perennial. The Thang-landers (inhabitants of Nan yang, in the south-east part of the province Honan) for this reason give it the name of *Muh Sho yo*,† or "tree-like most beautiful" (Pæonia Moutan). In the flower-garden, the *Mow tâns* claim the first place in point of beauty, and the *Sho yos* take the second rank; the former are occasionally named *Hwâ wang*,‡ "king of the flowers," and the latter *Hwâ seâng*, § "the king's ministers."

The most ancient author in China, Hung king († 536), considers the mountains called Tseàng shân, Pih shan, and Maou shan, as the places where the best white-rooted plants can be found, and considers the scarlet one, found elsewhere, very inferior in medicinal virtue.

The original native country of the *Mow tâns* is there stated to be the valleys of Pa keun, in the district of Hán chung, on the easterly part of the province Sse chuën, and the neighbouring south part of Shen se, or the country about the two rivers Kea lin keang and Han keang.

About these places also, the roots of the *Mow tâns* are brought to market as a medicine, for which purpose they are taken out of the ground, and slowly dried in some shaded situation.

The same author also mentions a pale rose-coloured sort, which was at that time grown in the province of Tung keën. The distinction of the *Sho yo* family into white and red-coloured sorts, adopted by Hung king, is also supported by Màs ze, "horse dealer," another author upon Natural Philosophy, who wrote about 968—975.

In the early part of the eleventh century the *Sho yo* plant was, according to Soo sung, distributed all over China, and the most valuable roots were considered to come from the country of Hwae gan foo (situated 33° 32′ 24″ N. Lat., 116° 54′ 12″ Long. easterly from Paris). The description of the plant given by that naturalist is as follows:—

"From the red heads, which make their appearance above the surface of the ground early in spring, a compact bush is formed one to two feet high; each stem is furnished with five three-lobed leaves, being narrower and longer than those of the *Mow tân* plant, to which they, however, bear much resemblance. At the early part of summer a red, white, or purple flower developes itself, producing afterwards a fruit resembling the *Mow tân* fruit, but of a smaller size; the harvest of the roots takes place in autumn."

Tsûy páou, an author of more recent date, distinguishes two sorts of *Sho yos*, viz. *Tsaou Sho yo*, or "the herbaceous one," and *Muh Sho yo*, or "the tree-like one." According to his statement, the latter one produces larger flowers and of a darker colour, and is known among the lower class (although erroneous) by the name of *Mow tân*.

* The original word 婥約 *Sho yo*, has afterwards been changed with the same-signifying word 芍藥 *Sho yo*, of equal meaning to *Sho*, "medicine." Loureiro being a Portuguese, in his "Flora Cochinchinensis" has used for this word, *Xo yo*.

† 木芍藥 ‡ 花王 § 花相

Towards the end of the eleventh century, when Chin ching wrote his Botanical volume (1086—1093) the *Sho yo* plant (originally growing in uncultivated spots) was grown all over the country in pleasure-gardens and nurseries; at that time the nurserymen and florists used their utmost diligence, also, by powerful manures to procure extraordinary large specimen plants, which, in consequence of their vigour, were productive of extra large-sized flowers. Their cultivation was at that time most general at Hwae gan foo and its environs, in the southerly district of the Hwae stream, from Hwae gan foo to Fung yang (32° 55′ N. Lat., and 115° 3(?)9′ Long. easterly from Paris), and at Chin yang (32° 35′ N. Lat. and 112° Long. east from Paris). The roots gathered and brought to market, during the 8th and 9th month are by the same author looked upon, notwithstanding their superiority in size, as possessing very little medicinal property, as well as having a bad smell and taste.

At the time of Le she chin, (1596) Yang chow (32° 26′ 32″ N. Lat., 117° 4′ 13″ E. Long.) was the most favourite place to have the *Sho yo* roots from; and the old reasoning that the *Mow tân* plant of Lo yang, (Ho nan foo) (34° 43′ 15″ N. Lat., 110° 3(?)7′ 40″ E. Long.) and the *Sho yo* of Yang chow, were generally considered most superior, and were in the author's time still in full power; the valleys and hills surrounding the Centralpike* were profusely furnished with *Sho yo* plants, whose roots were also gathered and brought to market.

The *Sho yo* plant, says this author, of which now thirty varieties are known, forms its buds about the 19th month (November), and develope from these the charming flowers at the ensuing spring. The red or white roots, gathered from the common red or white-blooming plants, are most suitable for medical purposes; after being taken out of the ground, properly scraped and cleaned, they are cut into small pieces, and then cooked from 9 A. M. to 3 in the afternoon, in a mixture of honey and water; they are afterwards in this state, when thoroughly dried, preserved until they are wanted.

After these observations relating to the distribution of the *Sho yo* plant, let us now return to the *Mow tâns*, about whose native country an author of the sixth century mentions the district of the rivers Kea lin keang and Han keang, on the easterly part of the province of Sze chuën, and the neighbouring south part of Shen se. Also Soo kung, an author who wrote, about the years 656—660, a work upon "Natural Philosophy," announces the province of Sze chuën (at that time called Këen nân) and the district of Han chung, as the native country of the *Mow tâns*, and particularly expresses his esteem for the white sort, whereof the roots are white-coloured within and red without, and which among the peasantry are known by the name of *Pih leang kin*, signifying "a hundred ounces of gold." During his life-time a considerable trade was carried on in *Mow tân* roots at Chang ugan, signifying "Long-rest," recently known by the name of Singanfoo (34° 16′ 45″ N. Lat., 106° 37′ 45″ E. Long.), which were then brought from the district Woo (now Nanking), or the south capital, with the environs in the south of the province Keang soo. He declares these roots to be the true genuine *Mow tân* roots, distinct from the more common sort, easily to be ascertained by their greasy, pork-like smell.

The distribution of the *Mow tân* plants as ornaments for gardens, may be considered first to have been introduced during the reign of the Emperor Yang te (605—616), who surrounded his residence Lo yang, with country seats and pleasure-gardens, in which everything precious and magnificent was to be collected together. The book upon the "Origin of Matters and Objects,"† says that, when *Mow tân* plants were first brought into notice, their cultivation was in a very short time so considerably augmented, that in the years Khae yuën (713—741), they could be met with everywhere, as well about the huts of the lower classes as about the noble seats of the great. Many new sorts were also at that period raised.

In a genealogical register of the *Mow tâns*,‡ thirty different varieties have been described, and bear names alluding to their origin, colours, or to the names of private individuals. The rarest varieties among them are—

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* 中 岳 Chung yo, at present called Sung yo, 嵩 山 or Sung shan, south-easterly from Honan foo.

† "*Sze wuh ke yuën*," according to the notes in the "Jap. Encyclopædia."

‡ Gow yang Sew. Mòw tân poo, or Genealogical Register of the Mow tâns, by Gow yang Sew.

1. The yellow (florist-flower), *Ya ôu,* with double yellow flowers.
2. The yellow (florist-flower), *New kea*, also double, but of smaller size than the former.
3. Vermilion-coloured (of *Ts' eën ke*), double.
4. The red (of *Hëen lae*), very large-sized, thousand-petalled and pale rose-coloured.
5. The red, called the "Crane's wing," *Ho lîng hûng*, many-petalled, white-coloured at the edge, and flesh-coloured at the base, similar to a Crane's wing.
6. A flower with a good many petals, purple tipped with white, called *Lotsaë hioa*, signifying "formed like a deer's belly."
7. The Glycyrrhiza-like. Yellow, *Kan tsaou hwâng*, single-flowered.
8. The King's Table, *Wâng pân*, with single white flowers, &c., &c.

At the time when Soo kung (556—660) pointed out the province of Sze chuën as being the native country of the *Mow tâns*, this very same spot, two centuries afterwards (in the years 968—975), when the author Tà Mîng published his "Materies Medica," boasted upon their produce to be the best *Mow tân* roots; and the towns in that part of the country, Pa, Sho, Yu, and Hö chow,* are mentioned by that author as the central places for their cultivation. He also states that the roots brought to market from the province Che keang, and especially from the spot called Haè yen (30° 35′ N. Lat., 118° 20′ E. Long.) are rather of inferior quality.

Soo sung, an author who published a work upon Natural Philosophy, during the reign of the Emperor Sung jin tsung (1023—1063), also mentions the district of the old Pa kewn in the province of Sze chuën, and now named Ho chow, as the place producing the best *Mow tâns*; in succession whereto he mentions Hô † chow (31° 44′ N. Lat., 116° E. Long.) and Senen chow (or the place now called Ning kwo, 31° 3(?)2′ 56″ N. Lat., 116° 24′ E. Long.) in the old Wooland. He distinguishes the *Mow tâns* from that country, from the common or mountain *Mow tâns*, the latter producing yellow, purple, red, or white flowers, and are met with in the mountains of Yen ngan foo and Y chuën (prov. Shen se), Ts ing chow (prov. Shan tung), Shaou hing foo (prov. Che keang), Choo Chow (32° 15′ N. Lat., 116° E. Long.), and Hô Chow (31° 44′ N. Lat., 116° 00′ E. Long.). He describes this common *Mow tân* as follows:—

"The stems of the plant are hard-wooded and ash-coloured. About the second month, from the top buds, the young shoots and leaves make their appearance, and in the third month the flowers develope themselves; the foliage much resembles that of the garden *Mow tân*, but the number of petals never exceed five to six. In the fifth month, the fruit, with its black seeds, is formed, which, as regards size, resembles the seeds of Celosia cristata. The roots or fibres being yellow or white-coloured, grow to the length of half or two-thirds of a foot, and attain the thickness of a common pencil. At present," so continues the author, "the *Mow tâns* are very much esteemed, and neither trouble nor expense is spared for the production of singular and extraordinary fine flowers. For this purpose transplanting and grafting is performed in the autumn or winter season, and the soil is very richly manured, in consequence whereof the spring allows a more vigorous development of the flower. The more, however, the plant by such treatment is improved in vigour, the more the roots lose their original medical property; to which idea the Medicus Kow tsung shih also inclines, who published a work upon Natural History about the year 1111—1117. This learned doctor far prefers the roots from the common sort growing on the mountains, particularly of the single red-blooming, and disapproves of the roots, and root-bark of the vermilion and bright blue-blooming sort."

The above observations, gathered from old Chinese sources, are considered in the "Natural History," "*Pên tsaou kâng muh*," by its author as correct, who also considers the double-flowering *Mow tân* as a useless medical plant, which property he only admits in the single red and white.

In point of medical virtue, he far prefers the common *Mow tâns* growing at Tân chow and Yen chow (now called E chuën, and Yen ngan foo, in the province of Shen se), and

* 巴 蜀 渝 合 洲 ‡ 和

from there more to the west, as also along the road of Paou ching (near Han chung, prov. Shen se) up as far as Sie; about the latter place, as stated in the "Genealogical Register of the *Mow tâns*," they are so very plentiful that the inhabitants gather them like common thorns for fire-wood. In the work "*Woo tsa tsoo*,"* we find mentioned, that no *Mow tâns* or *Sho yos* are found about the province of Fuh këen, and that the distribution of these plants has been limited to the province of Che kiang, and somewhat more to the south; such is also said of the Nephelium, *Le che*, and Nephelium, *Lung yàn.*

HISTORY AND DISTRIBUTION OF THE PÆONY IN JAPAN.

The Japanese distinguish, after the example of the Chinese, the common Pæony from the improved one, and call the first *Sjak yak*, and the latter *Botan*, being Japanese perversions of the Chinese words, *Sho yo* and *Mow tân.* The first also bears the name of *Karo yokusa*, or "plant which looks beautiful," being a Japanese translation of the Chinese name *Sho yo*, which we have before translated by "most beautiful." Their roots are also met with, under the name of *Jebisu gusuri*, or, "the medicine of the strangers."

Whether the Pæony plant really originates in Japan, or whether its roots have been brought there from China in the same manner as to Cochin-China,† is a question not exactly decided by Japanese authors, at least with respect to the common sort; they only name China as the original native country of the improved sorts. A Japanese "Gardener's Manual" upon the cultivation of plants,‡ commences its name-list of the Japanese improved sorts with the Chinese mother plant, which is there figured and described under the name of *Kara botan*, "Chinese Pæony," which of course gives considerable probability to what has been above stated. The improved Pæony from China, *Kara botan*, is the very same named in Japan, *Sisi botan*, "Lion Pæony," of which a red and a white-flowering sort exist, the first being of a pale purple colour with a white edge, and the latter of a dirty white, bearing a centre bud, which afterwards forms the black seed-vessel. The Chinese pictures only represent these two sorts; and it is from the seeds of these two sorts that we have obtained the many varieties of Pæonies now in cultivation. According to what the "Japanese Encyclopædia" communicates, regarding Pæony cultivation in Japan, the great interest which the *Sjak yak* and *Botan* flowers excited in China, took, about the same period, place in Japan, where they enjoyed great esteem ever since the days of Mikado Seïmu (A. D. 724).

The most splendid among the common Pæonies, says this author, is produced from the province Sinano, after which those from Tanba and Jse follow in succession; and in point of medical superiority, he prefers the plants growing on the mountains. The sorts grown in pleasure-gardens receive attention merely for the beauty of their flowers. As new flowers are continually raised, which, of course, obtain different names after the raiser's taste, the number of different varieties now in cultivation, augments every day, and exceeds the number of five hundred. The most valuable and esteemed sort is the blush-coloured, with dish-formed petals and a gold-coloured centre.

(*To be continued.*)

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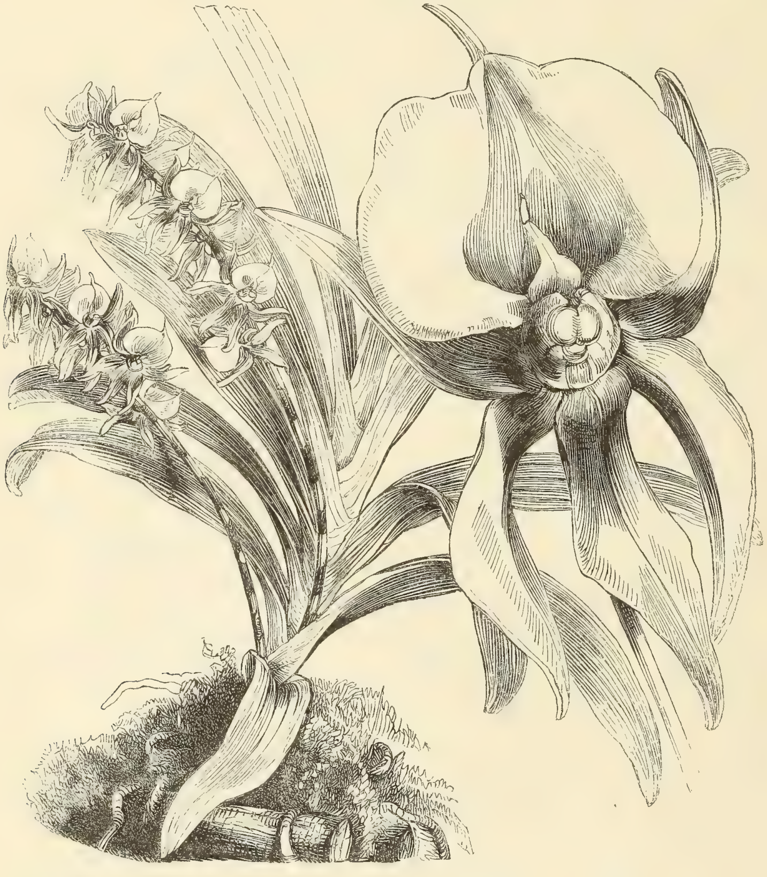
* According to a note in the "Jap. Encyclopædia."

† Loureiro, "Flora Cochinchinensis," p. 420.

‡ "*Kwa dan dai zen*," or "Treatise upon the Cultivation of Flowers," by the florist Kwakiuken Sjuzin Miyako, 1796, publication of 1788, pp. 7, 8.

MISCELLANEOUS.

New and Rare Plants in Flower. *Angrœcum eburneum.* This noble-looking plant lately flowered in the nursery of Messrs. Rollisson, Tooting, of which the accompanying vignette gives a small representation of the growth and manner of flowering, with a flower the size of life, with the exception of the tail-like appendage being an inch longer than represented. The broad massive lip is of the purest white, smooth and glossy, having much the resemblance of ivory, from which its specific name is derived; the sepals and petals pale greenish yellow, the tail green. The flower-scape is about two feet long, green, with dark bands or bracts every two or three inches; the flowers are placed back to back close to the stem, the peduncles being short and twisted. There is a beautiful as well as handsome appearance about this plant, from its characteristic growth, which, without the assistance of colour, gives a large amount of pleasurable gratification when seen in bloom.



Boronia triphylla. A nice young specimen of the above was exhibited before the Horticultural Society, in February last, by Mr. Ayres, Brooklands nursery, Blackheath. The plant was in most vigorous growth, and the foliage had nothing of the curled appearance usual to this species. Mr. Ayres stated that it had been grown throughout the summer in stove-heat, and wintered in an intermediate house, which treatment appears to have suited it most admirably. As a plant for winter decoration, it certainly is one of most charming as well as useful species in cultivation. The flowers are a rich rosy pink, and remain a long time in perfection of bloom.

Capsicum spe. nov. In the nursery of Messrs. Veitch and Son, Exeter, in August last, we observed a great novelty belonging to the ornamental peppers, by way of colour, most of the species bearing scarlet, or red fruit, of some shade; this one, however, is a pure yellow, bright and glossy, about an inch and a half long, and an inch diameter in the widest part or base, and tapering to a point. The fruit is more edible, not being so pungent as the other varieties generally are. The flower is small, white, and insignificant. The habit is neat, forms a handsome bush, and, as an ornamental plant, will bear comparison with any of its more showy allies.

Cattleya marginata. In the nursery of Messrs. Rollisson, Tooting, we noticed this pretty and interesting species in bloom. It seems to prefer being on a log of wood, suspended near the roof of the house. The species differs from C. pumila, by having the rich crimson of the labellum edged with white. It is very neat and attractive, and deserves a place in every collection.

Hoya spe. nov. A creeper from Java, introduced by Messrs. Rollisson, Tooting, in whose collection we have seen it flower. The species possesses an ornamental appearance, from the leaves being veined with white; the foliage is neat and good. The flowers are produced in clusters of eight or ten, of a creamy white, with a pink star-like form raised in the centre; the bloom is about three quarters of an inch across. Though not a showy kind of flower, for want of colour, the whole makes a desirable addition to this race of ornamental plants.

Pelargonium, "Gem of the Scarlets." This beautiful variety of the scarlet Pelargonium we have seen several times during the season, and have found that it blooms splendidly both summer and winter. In habit it is the counterpart of the old *globe, compactum,* with a strong horse-shoe brand on the foliage. It carries a fine truss of bloom, which remains in perfection from four to six weeks. The flowers are of the most dazzling scarlet, with a clear white spot in the centre, and in form round and compact. This beautiful variety was awarded a certificate of merit at the July exhibition of the Royal Botanical Society, Regent's Park, and it appears likely to become a very desirable plant for winter forcing as well as for bedding out in summer. The stock is in the possession of Mr. W. P. Ayres, Brooklands Nursery, Blackheath, in whose collection we have repeatedly seen it in bloom, and always true in form and character.

Primula spe. nov. A remarkable and beautiful species of Primula has recently developed its flowers in the collection of C. D. Derbyshire, Esq., Rivington, near Bolton, Lancashire, from whence it was forwarded to the Horticultural Rooms, in Regent Street, for exhibition. In habit it can scarcely be distinguished from our native Primula of the field, having bright, green glossy foliage, and flowers, which in shape and size, are much like it, yet the colour is a bright rosy purple; this, allied to its being a most abundant bloomer, makes the plant a most deserving one for the flower-garden. We hope to be able shortly to give a figure of it, which no doubt will be approved of by most of our readers.

Stephanotis Thouarsii. This plant we saw blooming a short time ago in the fine collection of Henry Colyer, Esq., at Dartford, Kent; but instead of the flowers being scarlet, as was represented by some parties, we find that the red or scarlet is entirely confined to the midrib of the leaves. The flower is pure white, rather larger than those of S. floribunda, but, as far as we could judge, in the winter season, quite destitute of perfume; so that, though a distinct species, in a decorative point of view it is not so desirable or useful a plant as S. floribunda. It is a plant of vigorous habit, and, where a collection of climbers is cultivated, is one well worthy a place.

Saccolabium spe. nov. Introduced from the hotter parts of India by Messrs. Veitch and Son, Exeter, in whose collection we saw it in bloom. In habit it closely resembles S. Blumei, most probably a fine variety of that species. It has a fine scape, sixteen inches long, and three in diameter, the blooms placed so thickly on the stem as to completely hide it. The flowers are of the medium size, a delicate lilac colour, very handsome and showy.

Salpixantha coccinea. A species of the order Acanthaceæ, subtribe Justicieæ, we noticed in flower recently, at Messrs. Henderson's, Pine Apple Place, Edgeware Road. The plant has a beautiful habit, fine glossy, bright green leaves, from the axils of which is produced the flower stem, about six inches long, holding a number of thin tubular flowers about an inch and a half long; the limb spreading about the third of an inch across. The flower resembles an Epacris in form, and is of a deep bright crimson colour. We should prefer seeing the plant better established, producing its flowers naturally, before giving our opinion as to its value as an abundant bloomer. Its beautiful habit is a strong recommendation for its success.

ZABUCAJO. *A new esculent nut, recently imported.* In the museum of the Royal Gardens, at Kew, may be seen some nuts or seeds under the name of *Zabucajo.* They were brought from Edinburgh and Glasgow, where they are sold at the fruiterers' shops, being extensively imported from Para to Glasgow, and are much used at table for the dessert. In size and shape they are not much unlike the so-called Brazil-nuts (seeds of *Bertholletia excelsa*), they are equally covered by a hard coat, but are more irregular, and are longitudinally furrowed. They are the fruit of the *Lecythis Zabucajo* of Aublet. The seeds are said to be much eaten by the colonists in French Guiana, being sweet and delicate, and considered preferable to the almonds of Europe. On account of the excellency of the seeds, the French government, much to their credit, introduced the cultivation of this tree into the Mauritius, nearly a century ago; and, in 1761, Aublet mentions that the plants were then in a flourishing condition. The entire fruit is, like all the *Lecythideæ,* highly curious; it is six inches and more long, and about four wide, of a thick and woody texture, opening at the top like a box, with a transverse lid, from the upper side of which lid, a woody column descends to the bottom of the inside of the fruit, and around this column the large seeds are arranged.—Hooker's *Journ. of Bot.* 21.

CORCHORUS CAPSULARIS. Time was, when hemp and flax yielded almost, if not altogether, the only vegetable fibre largely manufactured in Great Britain into cloth, cordage, &c. It would be interesting to give a list of the various kinds that are now in use, and still more interesting to speculate on the numerous kinds which may yet be added to that list from various parts of the world, the introduction of which does not appear in any way to diminish the consumption of the original kinds, hemp and flax. The fibre of the *Corchorus capsularis* of Willdenow is long, durable, and glassy, and is named by the Indians, Jute; ten years ago the use of this fibre was unknown in Europe, but now it is imported to Great Britain to the pecuniary amount of 300,000*l.* annually. This *Corchorus* has nothing to do with the Japanese yellow-flowered shrub (*Kerria japonica*) incorrectly called *Corchorus*, in our gardens (one of the *Rosaceæ*), but belongs to the natural family of *Tiliaceæ*, the various genera and species of which abound in useful fibre, from the gigantic Lime-tree (*Tilia*) to the herbaceous annual here noticed.—Hooker's *Journ. Bot.* 25.

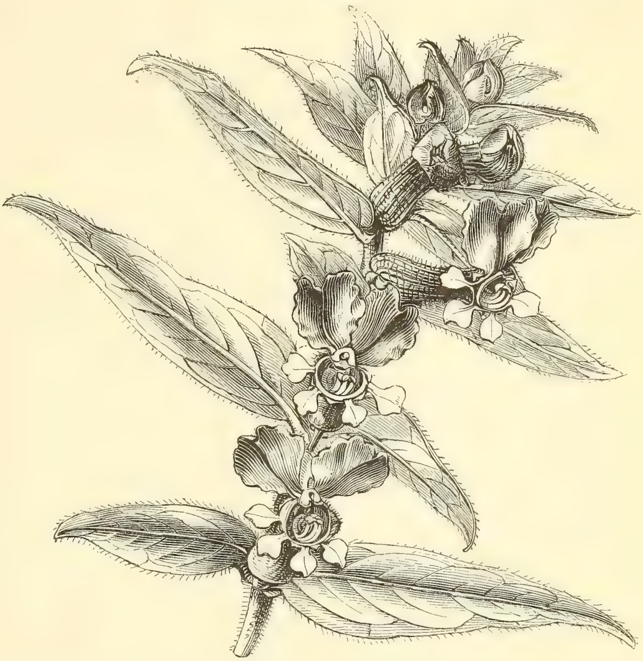
Musa textilis, or Manilla Hemp. That beautiful kind of muslin, "Manilla handkerchiefs" and "Manilla scarfs," is made of the delicate threads of the *Musa textilis*—a species common in the Philippine Islands, and which was first clearly defined by Don Luis Nee, in the "Annales de Ciencias Naturales," vol. iv., p. 123. The inner portion of this plant yields, perhaps, the most delicate of all vegetable fibres.—Hooker's *Journ. Bot.* 28.

Damask Roses. *Rosa Damascena.* In common parlance, all dark Roses are termed damask, probably from the first dark varieties having borne this name. But this is erroneous. There are dark Roses belonging to almost every group; and there are damask Roses of various colours; some are even white. The damask are readily distinguished from others by a robustness of growth, in conjunction with rough, spinous shoots, and downy, coriaceous leaves of a light green colour. Owing to this latter feature, they present a striking contrast when introduced amongst other groups. The flowers are mostly of a fair size; some are large, and all are showy. Belonging to them are some very pretty pink Roses, with a delicate tint of salmon pervading the flowers, rendering them alike distinct and beautiful. The damask Rose is allowed to be of great antiquity. Some supposed it to be of this Virgil speaks in the "Georgics," and elsewhere. It is generally believed that it was first introduced from Syria, and brought to England in 1573. But Johnson, in "The History of Gardening," says, "the learned Linacre, who died in 1524, first introduced the damask Rose from Italy." For two hundred years after its introduction this Rose underwent but little change; modern Rose-growers, however, have improved and varied it to such a degree, that the favourites of so long standing are threatened with oblivion. The damask Roses are all very hardy, thriving well either as standards or dwarfs. They do not form compact-headed trees, but their growth is graceful; rather more rambling than that of the French Roses. They flower abundantly; in some instances the flowers rest amongst the leaves and branches which surround them; in others they are elevated above. It is chiefly from the petals of this species, in common with those of the Provence (*R. centifolia*), that rose-water is distilled.—Paul's *Rose Garden*, p. 19.

Provence Roses. *Rosa centifolia.* Who has not heard of the Provence, or, as it is more frequently called, the "Cabbage Rose?" There are numerous varieties, though nature has not been so lavish with her stores here—has not answered so fully to the strivings of art to improve this group—as in some other instances. Perhaps the old favourite was so perfect that it could not be surpassed. The Provence Roses are deliciously fragrant; their habit is for the most part branching, or pendulous; and among them are some of the finest shaped globular-shaped roses grown. The foliage is bold and handsome; the leaflets broad and wrinkled, in many instances obtuse; the edges deeply serrated. The prickles on the branches are very unequal; some are fine and straight; others large at their base, and falcate. These points, with the drooping habit, and usually globular flowers, serve as marks by which we distinguish them. They thrive well either as dwarfs or standards; but some varieties require the fostering care of the cultivator to tempt them to produce their flowers in full beauty. To ensure complete success, plant them in a soil made rich, and water them occasionally in spring with liquid manure. All, except the vigorous-growing ones, which are in many instances hybrids, should be subjected to close pruning. The hybrids are so robust in their nature, that they do not need more than ordinary attention.—Paul's *Rose Garden*, p. 25.

The French Roses. *Rosa Gallica.* The French, or "Garden Roses," have been long, very long, under cultivation, and many of the old varieties are prolific beyond measure in producing seeds which vegetate freely. Hence is accounted for the number of French Roses which have been introduced to our gardens; and being in general full and finely-formed flowers, many even of the oldest are still admired and cultivated. They are very hardy, and thrive well in the commonest garden soil; although their beauty is greatly increased, if cultivated in a good soil, and planted in a favourable site. No kind can be more beautiful than French Roses; the flowers are of all hues, are remarkable for their brilliancy, fulness, perfect outline, regularity in the disposition of the petals, and delightful fragrance. In this group are many interesting striped, marbled, and spotted roses, singularly beautiful, and which, although highly popular in France, do not seem to suit the taste of English rose cultivators. To see them in perfection, they should be viewed early in the morning, before the summer's sun has dimmed their beauty. They are distinguished from the Provence Roses by a more upright and compact growth; the prickles are smaller and less numerous, and the flowers are more flat. French Roses form fine low standards; in which manner they are displayed to great advantage. In pruning, the heads should be well thinned out, as they are disposed to produce an abundance of shoots, far more than can be suffered to remain, if fine flowers, combined with the ultimate good of the tree, are the chief ends in view. Thin out the heads well; and, when pruning, cut the shoots back to four, five, or six eyes, or to where the wood is firm and well ripened, and the eyes full and plump.—Paul's *Rose Garden*, p. 40.

Cuphea purpurea (*Purple-flowered Cuphea*). This is a perennial herbaceous plant, growing from eighteen inches to two feet high. The stems are slender and leafy, with an erect growth, and of a pale green, tinged with rosy-purple. The leaves are opposite, ovate, acuminate, and covered with white bristly hairs. The petioles are very short. The flower-spike terminal and leafy. The flowers are solitary, springing from the axils of the leaves. The peduncles are short and hairy. The calyx persistent, long, cylindrical, tubular, gibbose at the base, oblique, lower part bright yellow-green, upper part tinged with rosy-purple. The corolla consists of six petals, of a rich deep carmine purple, the two upper ones are broad, four lower ones small, and with long claws. The stamens are enveloped in a purple downy substance.



Of the history of this pretty little plant nothing is with certainty known. We found it flowering in the nursery of Messrs. Low and Son, of Clapton, and had a drawing of it prepared in September, 1848. In habit and shape of flower it greatly resembles *C. miniata*, figured in our Magazine of Botany, vol. xiv., t. 101; the chief difference consisting in the colour of the flower, which, in our present subject, is of a bright rosy purple. Whether it is really a distinct species or only a hybrid, it is difficult with certainty to ascertain, but it is not improbable but it may prove to be the latter. In the nursery of Messrs. Knight and Perry, at Chelsea, it grew vigorously and bloomed freely in the open border last summer, and there bore the name of *Cuphea hybrida*, which, perhaps, tells the true history of its origin.

Upwards of seventy species of Cuphea are known and have been described, many of which are very handsome; all are natives of warm climates, chiefly within the tropics at different altitudes, but none have been found in sufficiently elevated localities to render them perfectly hardy in Britain. Several, however, will grow in the open air during summer if planted in a well-drained light soil, and in a warm situation; amongst these our present plant may be classed. When in flower during the whole of the autumn, it forms a very pretty border plant, and certainly deserves cultivating amongst a selection of herbaceous plants, but its stems grow too tall and leafy for it ever to become sufficiently conspicuous for grouping in the flower-garden. It may be easily propagated by cuttings of the half-ripened stems planted in light soil, or by dividing the roots.

Allamanda Schottii (*Mr. Schott's Allamanda*). This is a scandent shrub. The stems and older branches are smooth, but the young branches downy. Leaves three or four in a whorl, petiolate, large, lanceolate, acuminate, tapering to both ends. Petioles short, downy, with two small, acute stipules at the base. Flowers paniculate, terminal, and axillary. Calyx deeply cut into fine ovate-lanceolate, acuminate segments. Corolla large, of a clear rich yellow, funnel-shaped, tube long, and very narrow at the lower part, but wide and campanulate towards the top; limb divided into fine, spreading, rounded segments. The genus Allamanda is the Orelia of Aubl., the Galanips of Allamand, the Echites of Rœm. and Schultz, and the Allamanda of Linn., De Candolle, and others. The present species is the Allamanda Schottii of *Pohl. Bras.* i., p. 73, t. 50; *De Cand. Prod.* ix., 309; and *Hooker, Bot. Mag.* t. 4351. The Allamanda Braziliensis of *Schott*, and the Allamanda cathartica of *Schrad. in Diar.*, 1821, p. 707.

This fine species bloomed in the nursery of Messrs. Henderson, Pineapple-place, London, in October last. It was procured by those gentlemen from Mrs. Spooner, of Oak Villa, Southampton, who raised it from Brazilian seeds, presented to her by some of her friends. After being in her possession seven years, it flowered for the first time in the autumn of 1847, and proved itself a first-class stove plant, being a profuse bloomer, and possessing a very ornamental habit.

Seven species of Allamanda have been described by De Candolle in his "Prodromus;" the genus, however, is imperfectly known, and much confusion has in consequence hitherto existed. Two kinds were figured by us in our Magazine of Botany; the first, in vol. viii., t. 77, under the name of A. cathartica of Linnæus, and others; it is, however, identical with A. Linnæi of Pohl, and some other authors. The second is figured in vol. xii., t. 79, and is there named A. grandiflora, with an intimation that it may not be a distinct species but only a variety of A. cathartica; subsequent observations and experience have proved our supposition to be correct. The A. grandiflora is only a variety of A. cathartica, and is identical with the A. Aubletii of Pohl, the Orelia grandiflora of Aublet, the

Echites salicifolia of Rœm. and Schultz, and the A. carthartica of the *Bot. Mag.* t. 338. Our present plant we believe to be a distinct species, and the true Schottii of Pohl; it has a decided climbing habit, however, and in this respect differs from the plants of that name sold in the nurseries, and also from the one figured and described by Sir William Hooker, as A. Schottii, in the *Botanical Magazine,* t. 4351, which was raised from Brazilian seeds, sent by Mr. Graham to R. W. Barton, Esq., Springwood, Manchester, and which Sir William says has an upright growth, and commences flowering when the plants are very small. There is no doubt, however, but both the subjects are varieties of the one species.

In cultivation, the temperature of a hot and moist stove is necessary.

The soil should be composed of two parts light turfy loam, one part very rotten leaf mould, and one part sandy peat, broken and intimately mixed together.

It is usual to subject these plants yearly to a severe pruning, seeking rather to obtain the summer's growth from the base of the old stem, than to preserve much of the previous season's shoots, and to provide them early in spring with a suitable warmth and moisture, as well at the roots as in the atmosphere.

The flowering season is of long continuance,—a succession of bloom daily expanding during the whole of the autumn and early winter.

Cuttings of this very desirable plant are readily struck in pots of sand plunged in a little heat, under glass.

The genus is named in honour of Frederick Allamand, a surgeon, of Holme, who travelled in Guiana about the year 1769, and probably discovered one of the species.

THE DIVI LADNER OF CEYLON. This tree is a species of *Tabernœmontana,* a very interesting genus, of which more than seventy species are known; but not more than twenty have yet been introduced. All are shrubby; some grow into moderately sized trees, but the greater part are shrubs not exceeding ten or twelve feet in height. The species are natives of tropical countries, the growth handsome; leaves opposite and shining, and the flowers produced in cymes and corymbs. The colours are chiefly white or yellow, and the greater part sweet-scented; some are exceedingly fragrant, amongst which the following may be noticed particularly:—T. alba, amygdalifolia, citrifolia, dichotoma, odorata, and recurva. The *first* bears white flowers, with a similar fragrance to a jasmine; it grows in the woods of Martinico, and was introduced in 1780, and grows to a shrub ten or twelve feet in height.

T. amygdalifolia, or almond-leaved, is a native of the woods of Carthagena; it also produces white flowers, exceedingly sweet-scented; and was introduced in 1780, and forms a bush six or eight feet in height.

T. citrifolia (citron-leaved). The flowers of this species are of a rich golden yellow, very fragrant, and are produced freely; it is found wild in the West Indian Islands, where it grows to a tree fifteen or twenty feet high. It was introduced in 1784.

T. dichotoma. The Divi Ladner; or supposed Forbidden fruit of Paradise. This species is a native of Ceylon and Malabar; the flowers are pale yellow, and exceedingly fragrant. It is the T. alternifolia of some travellers, and the "Eve's apple" of the descendants of the Portuguese in Ceylon.

The name applied to this tree by the latter people originates in the tradition which prevailed in former days among the Mahometans and Portuguese, that Ceylon was the Paradise described in the Scriptures; that the Garden of Eden was situated in it; and that the fruit of this tree was the forbidden fruit of which Eve ate. In confirmation of this tradition, they referred to the beauty of the fruit, and the delicious fragrance of the flowers, which are most tempting; and they state the former was a most excellent fruit before Eve tasted it. The shape gives it the appearance of a fruit, a piece of which had been bitten off; but its effects are at present deadly poisonous. The tree grows to about twelve or fifteen feet in height; but is, perhaps, not yet introduced to our collections.

T. odorata (the sweet-scented) is a native of Surinam and Guiana; the flowers are large, of a pale yellow, and are produced freely. It was introduced in 1793, and grows to about the height of four feet.

T. recurva (recurved-flowered) is a native of the East Indies, with pale-yellow drooping flowers, and a delicious fragrance. It was introduced in 1824, and figured by Dr. Lindley, in the *Bot. Reg.* t. 1840.

All the species are of easy culture in the stove, merely requiring to be planted in a mixture of loam, peat, and sand; and young plants may be obtained by cuttings, planted in sand, under a glass in a moist heat.

NEW AND BEAUTIFUL PLANTS FIGURED IN THE BOTANICAL PERIODICALS.

Aerides crispum. *Sir R. Brooke's Air-plant.*—This is the A. Brookei of *Bateman in Bot. Register*, 1841, and of our *Mag. of Botany*, vol. ix. t. 145. It is a native of Courtallam in the East Indies, and is one of the most lovely of the genus. Being a native of a hot and moist climate, it requires to be kept in the warmest division of the orchid house with a larger portion of light than is usually given to plants of this description. After the flowering season, lessen the supply of water, and give the same treatment as other species of Ærides. —*Bot. Mag.*, 4427.

Æschynanthus Paxtoni. This plant has large, convex, dark green, even leaves, which are slightly marked on the under side with impressed dots. The bracts are of unusual size, thin, pale green, slightly stained with red. The sepals are remarkably large and broad, and are divided to the very base. The flowers are dull red, with a flat limb, divided into four nearly equal lobes, which are square at the end, as if they had been cut off. It seems to be most nearly allied to Æ. ramosissimus and Griffithii. It forms a trailing half shrubby stove plant, growing either in a well-drained pot of leaf-mould and broken crocks, or fixed to a block of wood, and surrounded with moss. It requires a moist atmosphere whilst in a growing state, but afterwards should be kept nearly dry.—*Jour. Hort. Soc.*, 80.

Calanthe Vestita. *Shaggy Calanthe.* A large silver medal was awarded by the Horticultural Society, in November last, to Messrs. Veitch and Son, for a fine specimen of this beautiful species of Calanthe. It was imported from Moulmein, and bears large spikes of white flowers, stained in their centre with crimson. Among the many orchids which have been imported of late years to our gardens, this is one of the most handsome and striking.—*Jour. Hort. Soc.*, vol. iv., 8.

Exacum Zeylanicum. *Ceylon Exacum.* A beautiful annual, raised from Ceylon seeds by Mr. Moore, of the Glasnevin Botanic Garden, Dublin, where it produced its purplish-blue flowers in September, 1848. It is really a striking plant; and may be increased by seeds, which should be sown early in the spring in pots filled with sandy peat soil, and as they are very small they require no covering of earth, but merely that the mould should be gently pressed down. The pot should be placed near the glass in a damp corner of the stove, or a pan of water should be set under them, as it is very necessary that the mould in the pot should be kept in a moist state, without having occasion to sprinkle water over the surface; for if that is done, the small germinating seeds are disturbed. When the young plants are sufficiently strong, pot off into loose turfy soil with good drainage.—*Bot. Mag.*, 4423.

Loasa picta. *Painted-flowered Loasa.* An extremely pretty species of Loasa, native of Chacapoyas in the Andes, where it was detected by Mr. William Lobb, and seeds were raised by Messrs. Veitch and Sons at their nursery, Exeter. There is every reason to believe it will prove a half-hardy annual, well suited for bedding out in the summer, when its graceful and lively flowers, yellow and white, with a red eye, cannot fail to prove attractive. The seeds should be sown in April, in a frame or pit, and by the end of May, it will be safe to turn it out into the flower borders.—*Bot. Mag.*, 4428.

Lisianthus pulcher. *Pretty Lisianthus.* This is one of the most beautiful of the genus. It was discovered by Mr. Purdie, during his botanical expedition to New Granada, growing in Monte del Moro. The plants in their young state appear to be rather delicate. It is said by Mr. Purdie to form a suffruticose shrub, from five to seven feet high, and two or three feet in diameter, growing at an elevation of between 7,000 to 8,000 feet on shelly limestone rocks, which are covered with a thin stratum of peaty soil of a dry nature. It may, perhaps, do the best kept in a close greenhouse, potted in loose peat soil, well drained, and with a few pieces of limestone mixed through the soil.—*Bot. Mag.*, 4424.

Miltonia spectabilis purpureo-violacea. *Purple-violet Miltonia. See* p. 77.

Miltonia Karwinskii. *Count Karwinski's Miltonia.* This is the Cyrtochilum Karwinskii of the *Bot. Reg.* t. 1992; and the Oncidium Karwinskii of the *Sertum Orchidaceum*, t. 25. This beautiful plant was received by the Horticultural Society from Mr. Hartweg, and is supposed to have been collected at Oaxaca, in 1839. The flower-scape is nearly three feet long; stiff, and almost upright; being covered for three parts of its length, at intervals of an inch and a half, with large gay white, purple, yellow, and brown flowers, fully two inches and a half in diameter. The sepals and petals are bright yellow, barred and spotted with brown; the tip is white at the point, deep violet at the base, and blush in the middle space. The column is nearly white, and adorned by two serrated hatchet-shaped wings. It requires to be treated like an Oncidium, and to be grown in rather a cool temperature, in pots filled with fibry peat, and half-decayed leaves, well drained.—*Jour. Hort. Soc.*, vol. iv., 83.

Polygonum vacciniifolium. *Vaccinium-leaved Polygonum.* Raised from seeds received by the Horticultural Society from Captain W. Munro, from Northern India. It forms a trailing plant, with half-shrubby stems, and is an extremely pretty species, growing freely in any good well-drained loamy soil, and is easily increased by cuttings. Its spikes of deep rose-coloured flowers are a great decoration during autumn to rock-work, as they continue to retain their gay colours until the frost changes them to a warm brown.—*Jour. Hort. Soc.*, vol. iv., 80.

Swammerdamia antennaria. A small, compact, evergreen bush, found wild in Van Diemen's Land, on the sides of Mount Wellington. It is hardy, and grows freely in any common garden soil, being readily increased by cuttings planted in the usual way. The flower-heads are small, white, and collected in little lateral corymbose panicles.—*Jour. Hort. Soc.*, vol. iv., 77.

CALENDAR OF OPERATIONS FOR APRIL.

The period of growth has arrived; use every means to facilitate the progress of vegetation under glass; give a humid atmosphere, in plant-houses especially; admit air freely according to circumstances, and allow the entrance of as much light as the season will afford.

FRUIT AND VEGETABLE DEPARTMENT.

Glass.

Cherry Trees, in pots and tubs, are now about stoning; be careful by a free admission of air, and only a moderately warm atmosphere, not to hurry them too much over this critical period of their growth; supply the roots with weak liquid manure, and allow the free access of all the light they can have.

Cucumbers may be watered liberally, have abundance of air, and plenty of bottom heat, under which circumstances, if kept properly pruned, they will now bear freely.

Figs. Water freely at the roots, and give liquid manure every day; syringe in sunny weather; as the young wood advances in growth, stop at about every four joints, this will expedite the growth of the fruit, and render the plants compact bushes.

Peach-houses. The trees in this department must now have as much air as the weather will permit, if the fruit are stoning.

Pineries. The plants in the fruiting department will now be rapidly swelling up; give a very humid atmosphere; a free circulation of air, and such assistance as is requisite to keep in a free growing state.

Vineries. Stop, prune, tie in, and thin, when and where necessary, and allow the entrance of as much light as possible.

Open Air.

Apricot Trees will require looking over as soon as the leaves appear, and if the foliage is curled or webs are seen, caterpillars are secreted in the buds; open the leaves and destroy them, or they will become troublesome.

Apple Trees. Look through the orchard at this time and see if there are webs formed amongst the young bursting leaves or flowers; if so, examine, and a number of small yellow caterpillars, marked with black lines are found; they are the larvæ of the green-veined white butterfly, (Pieris Cratægi,) which are often, during the spring, very troublesome. The perfect insect is about the size of the common cabbage-butterfly; the wings are somewhat transparent, and of an uniform white colour, nerved with black. The caterpillars live in societies, under silken webs, in which they form little cases to secure them from the severe weather during winter. At the end of March or beginning of April, they begin to break these webs, and attack the young bursting buds; every evening they return to their webs, and do not quit it on rainy days. The chrysalis is of a yellow colour, streaked, and spotted with black.

Protect blossoms on wall trees with nets or other covering.

Peas and Beans. Sow twice in the month.

Potatoes. About the end begin to plant out the late crops.

Cauliflowers. Towards the end, sow a little seed, to produce from October to Christmas; and finish planting out those sheltered in frames.

Kidney Beans. Sow about the end of the month on a warm border.

FLOWER DEPARTMENT.

Glass.

Conservatory and Greenhouse. These structures will now be very gay; azaleas and other similar plants will be in bloom; give a partial shade if the weather be very bright; throw a little water on the floors, occasionally, to keep the air humid, and they will continue much longer in perfection than under other circumstances.

In the Forcing Pits. Cuttings of various tender plants may be struck, so as to keep the house employed as the flowering plants, which have been forced, are removed.

Cold Frames and Pits may be fully exposed, so that the plants can have the full benefit of the air; but frost must be guarded against.

Orchid-house. This is a busy time amongst orchids; newly potting, re-arranging, starting into growth, and fixing the shading apparatus, are amongst the chief things now.

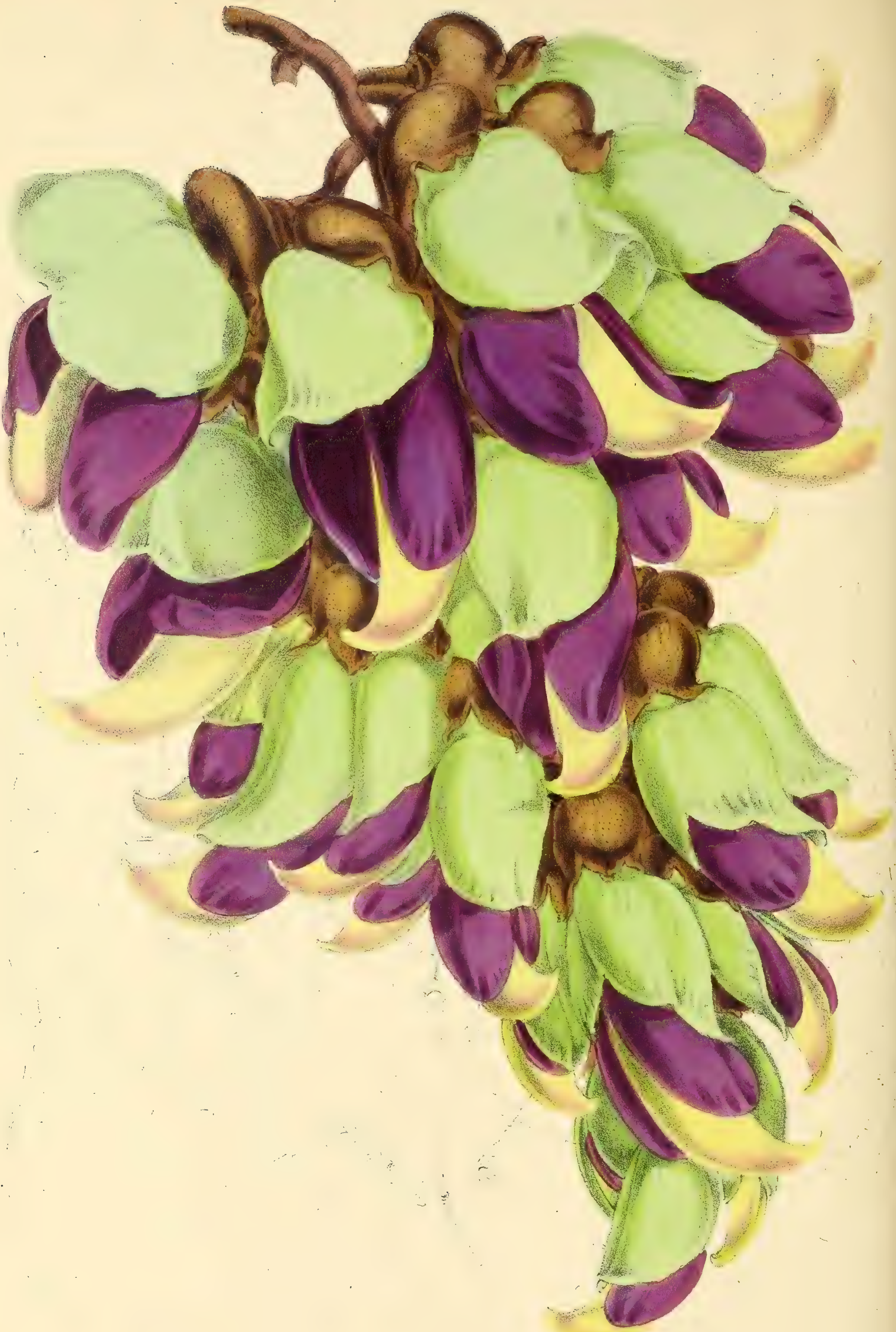
Open Air.

Mowing and dressing lawns, pruning, training, preparing beds in the flower-garden for receiving the plants for grouping, must now be attended to, without delay.

FOREST DEPARTMENT.

Nursery. Propagate by layers; clean seed-beds; continue to plant evergreens in damp weather.

Sow various Forest tree seeds, as Acorns, Walnuts, Chestnuts, Beech, and the various species of Pinus.



W H Fitch ad. & Lith.

Mucuna macrocarpa.

PAXTON'S

MAGAZINE OF GARDENING AND BOTANY.

MUCUNA MACROCARPA. (Long-fruited Mucuna.)

Class, Diadelphia.——*Order*, Decandria.——*Nat. Order*, Fabaceæ.——(Leguminous Plants, *Veg. King.*)

Generic Character.—*Calyx* campanulate, bilabiate; lower lip trifid, with acute segments, the middle segment drawn out most; upper lip broad, entire, and obtuse. *Corolla* with assurgent vexillum, shorter than the wings and keel. *Wings* oblong. *Keel* ensiform, or straight, acute. *Stamens* diadelphous, five of the anthers oblong-linear, and the other five ovate and hairy. *Legume* oblong, torose, two-valved, hispid. *Seeds* round, with the hilum girded by a circular mark.

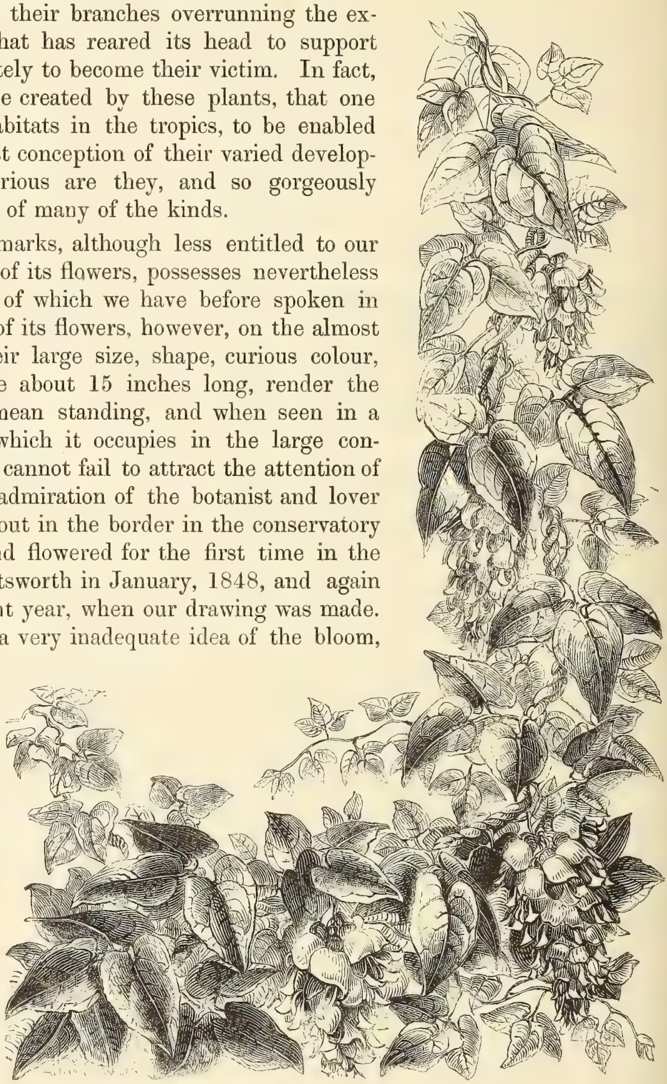
Specific Character.—*Plant* a shrub. *Stems* twining, extending to 40 or 50 feet in height, flexuose. *Leaves* pinnately-trifoliate, sparingly pilose; *leaflets* cordate. *Racemes* axillary, pendulous, 18 to 21 inches long, many-flowered. *Flowers* large. *Calyx* bibracteate, middle tooth of the lower lip diverging at the apex, tube oblique at the base, surface indurated, of a yellow-green, and covered with a ferrugineous tomentum. *Vexillum* large, yellow-green, partially ascending. *Wings* oblong-lanceolate, rounded at the apex, lunate at the base, of a deep and rich purple. *Keel* sword-shaped, longer than the wings, of a purplish-brown, acute. *Legumes* long, ensiform, hispid, from being covered with short brittle hairs, many-seeded.

Authorities and Synonymes.—Mucuna, *De Candolle's Prod.*; *Juss. Ann. Mus.* Stizolobium, *Persoon's Synopsis.* Citta, *Loureiro.* Carpopogon, *Roxburgh's Hort. Beng.* Macroceratides, *Raddi.* Negretia, *Ruiz and Pavon.* Hornera, *Necker.* Mucuna macrocarpa, *Wallich's Pl. Asiat. Rarior.*, i. t. 47. Dolichos macrocarpus *of some authors.*

The subject of our present plate is without doubt the handsomest species of Mucuna known. The plant is a very lofty grower, and the racemes, which are produced abundantly on the old wood, are very large, and the quantity of flowers in each are prodigious. The plant at Chatsworth, from which our drawing was prepared, grows at the south end of the large conservatory, and being a climber of rampant growth, it has ascended to the roof, over some part of which it has spread its branches to a considerable distance. One of the racemes produced in February, 1848, was found on measurement to be 21 inches long, and contained as many as eighty-eight or ninety flowers, seventy-five or more being expanded at the same time; and this was far from being a solitary case; many others appeared equally as large, and perhaps contained even more flowers than the one described. The colours, however, are by no means lively, the standard being of a pale yellow-green, the wings deep purple, and the keel purple-brown. The flowering season continues from December until March.

The plant is a native of the East Indies, chiefly in the north of Hindoostan, about the mountains of Nepal, and was introduced to this country by the Duke of Devonshire in 1837 through Mr. Gibson, his Grace's collector, where, at Myrung, on the Khoseea hills, according to Mr. Gibson's own memoranda, he found it growing in wild luxuriance, unequalled, perhaps, by very few, even of the most robust of the Indian creepers. And this leads to a few general observations on the habits of this beautiful portion of the Indian Flora, whose great feature is the extraordinary manner in which they take possession of, and overrun the most gigantic denizens of the forest, literally covering them with a mantle of their own, which renders them more ornamental and varied under the yoke of death, than the most perfect development of their own leaves and blossoms could effect. Mr. Gibson was often surprised in the jungle with their peculiar habit and form, and used to wonder how the fragile stems of these plants could rear their heads and reach even the lower branches of these patriarchs of the forest, which support them, and very frequently die under their grasp; and more particularly so, as they are generally found situated at a considerable distance from their stem, very seldom close to it, as one would naturally enough suppose, but rise independently, until they reach the lower branches, as though some huge spider had cast her line, and this had proved sufficent to aid and guide them to their wonted position. And it may be further observed, that the stems of these plants present the most curious and interesting appearance, being twisted, festooned, and entwined so closely together, as sometimes to resemble the cable of a ship, but flattened as in the genus *Bauhinia*, and sometimes like a thick rope or hawser, as in the object of these remarks, and presenting the most grotesque and interesting combination of outline and form; with their branches overrunning the extreme limit of the tree that has reared its head to support them, and perhaps ultimately to become their victim. In fact, so picturesque is the scene created by these plants, that one must visit their native habitats in the tropics, to be enabled to appreciate or form a just conception of their varied development and beauty, so curious are they, and so gorgeously beautiful are the blossoms of many of the kinds.

The object of these remarks, although less entitled to our encomiums on the beauty of its flowers, possesses nevertheless the extraordinary features of which we have before spoken in its habit. The profusion of its flowers, however, on the almost innumerable racemes, their large size, shape, curious colour, and the large flat legume about 15 inches long, render the plant an object of no mean standing, and when seen in a situation similar to that which it occupies in the large conservatory at Chatsworth it cannot fail to attract the attention of the uninitiated, and the admiration of the botanist and lover of plants. It was planted out in the border in the conservatory at Chatsworth in 1839, and flowered for the first time in the large conservatory at Chatsworth in January, 1848, and again in February of the present year, when our drawing was made. Our present figure gives a very inadequate idea of the bloom, as only one diminutive raceme was this year produced, whereas in 1848 the racemes were numerous and very long, also the individual flowers were much larger.



Two members of this genus (of which about twenty have been noticed or described), furnish an article long known in medical practice under the name of Cow-itch, which is composed of the long sharp brittle hairs that clothe the seed-pods of *M. urens* and *M. pruriens*, the former a native of the West Indies, and the latter having a much wider range, growing wild in the West Indies, Guinea, Malabar, and the Moluccas, being thus found in three out of the four great divisions of our globe. In the West Indies both kinds abound, overrunning waste ground, sugar-cane fields, and fences much after the manner of our *Calystegia sepium*, or Bindweed and Convolvulus arvensis.

When Cow-itch is applied to the skin, it produces an intolerable itching from the small hairs penetrating, and this is even the case with the thick skins of the negroes in those parts. It has been found useful in medicine.

The seeds, however, which are the ox-eye beans of our Colonies, are cooked and esteemed as good as kidney-beans.

Only a few species of Mucuna are deserving of cultivation, where only a selection of plants is grown; amongst these *M. macrocarpa* must take the precedence. It will grow in any light rich soil, and must have plenty of pot-room, a good supply of water at the roots, and sufficient space for its tops to spread. Propagation is effected by cuttings planted in sand, and placed under a glass in heat. It is a hardy stove plant, and will no doubt thrive in a warm greenhouse.

The generic name is derived from *Mucuna-guaca*, the Brazilian name of *Mucuna urens.*

HELIOTROPIUM PERUVIANUM VOLTAIREANUM. (M. Voltaire's Turnsole.)

Class, PENTANDRIA.——*Order*, MONOGYNIA.——*Nat. Order*, EHRETIACEÆ——(Ehretiads, *Veg. King.*)

GENERIC CHARACTER.—*Corolla* salver-shaped; *throat* usually naked, but in some bearded; *segments* of the limb furnished with a simple plicature, or a tooth between each. *Stigma* sub-conical. *Carpels* four, one-celled, combined, closed at the base, without any manifest receptacle.

HELIOTROPIUM VOLTAIREANUM.—A garden hybrid, with the habit and appearance of *H. Peruvianum.*—*Plant* shrubby. *Leaves* petiolate, oblong-lanceolate, wrinkled, repand, clothed with soft hairs above, and somewhat canescent beneath. *Flower-spikes* terminal, branching into three or four, rarely compound. *Flowers* sweet-scented, smelling like Vanilla. *Corolla* intersected by five plicatures of a deep purple-blue colour, with a greenish-throat, rather larger than that of *H. Peruvianum.*

AUTHORITIES AND SYNONYMES.—Heliotropium, *Tournef. Inst.*; *Lin. Gen.* Heliotropium Voltaireanum, *Continental and British Nurseries.*

OF about ninety species of Heliotropium described by Botanists, not more than twenty have been introduced to Britain, and of these only three are what may be termed popular flowers, the *H, Peruvianum*, *H. corymbosum* (*grandiflorum*) and *H. europæum.* Each possesses a grateful fragrance, not unlike that of the Vanilla, on which account chiefly, they have always been highly esteemed. The *H. Peruvianum* is a well-known greenhouse shrub, a native of Peru, becoming during the season of its torpidity in winter, partially denuded of its leaves; hence it may be considered deciduous. It was introduced in 1757, and has long been extensively cultivated. *H. corymbosum* is also a native of Peru, but was not introduced until about the year 1800; it forms a dwarf shrub like the last, which it greatly resembles in habit, but its foliage is coarser, and the leaves are retained during the winter; hence it may be denominated an evergreen. The flowers of both the above are purple-lilac, and bear a considerable resemblance to each other, so much so that they might at first sight be easily confounded with each other, but the *H. corymbosum* is inferior in beauty to the *H. Peruvianum.* *H. europæum* is an annual, with white flowers, a native of various parts of the South of Europe, whence it was introduced to England in 1562; it is much less grown than either of the others.

Our present subject is an excellent variety of *H. peruvianum*, raised on the continent, and was introduced from Paris to this country a few years ago, but with whom it originated we are quite unable to say. It differs from the species in the size of the individual flowers, their deep purple colour, and their large spreading corymbs; in other respects it exactly agrees.

The cultivation is of the easiest kind; the ordinary treatment of greenhouse plants is all that it requires. A light soil, composed of equal parts of light rich sandy loam and heath-mould, with a little sand to keep it open, form the best compost; and young cuttings separated from the plants in spring as soon as they have grown a sufficient length, and planted in pots of soil in a gentle moist heat, will strike root with the greatest freedom.

The name is derived from *helios*, the sun, and *trope*, a turning, because the flowers are supposed to turn towards the sun. The genus was called *Verrucaria* by the Latins, because the juice of the leaves, mixed with salt, was supposed to be a cure for warts (*verrucæ*).

MINA LOBATA. (Lobe-leaved Mina.)

Class, PENTANDRIA.——*Order*, MONOGYNIA.——*Nat. Order*, CONVOLVULACEÆ.

GENERIC CHARACTER.—*Calyx* short, naked, five-parted. *Corolla* hypocrateriform; *tube* short, and much thrust into the inflated limb; *limb* campanulate, inflated, five-sided, and terminating in five lobes. *Stamens* unequal, attached to the tube, exserted. *Ovary* four-celled. *Ovules* solitary. *Stigma* capitate.

SPECIFIC CHARACTER.—*Plant* a twining biennial. *Stems* glabrous, terete. *Petioles* an inch or more long, smooth. *Leaves* cordate, three-lobed, slightly villous beneath, glabrous, and of a bright green above. *Peduncles* long. *Racemes* forked, each part bearing nine to twelve flowers. *Calyx* green, tinged with red, short and fleshy; divided into five oblong, keeled, acute segments. *Corolla tube* short, orange-yellow; *limb* half-an-inch long, at first of a rich and brilliant carmine colour, but changing as it expands to deep orange, and becomes finally of a pale yellow; *lobes* small, rounded. *Stamens* inserted in the mouth of the tube; *filaments* long, slender; *anthers* kidney-shaped, attached by the middle, yellow. *Ovary* surrounded by a small fleshy gland.

AUTHORITIES AND SYNONYMES.—Mina, *La Llave.* Quamoclit, *Tournefort, and other Botanists.* Exogonium, *Moçino, and others.* Morenoa, *La Llave.* Mina lobata, *La Llave and Lexarza, Novorum Veget. des. fas.*, i. 3.; *Dr. Lindley*, in *Bot. Reg.*, v. xxviii., Miscel. 9, t. xxiv. Quamoclit Mina, *Don's Gard. and Bot.*, v. iv., p. 259.

THIS handsome Convolvulaceous plant is a native of Mexico, whence it was introduced by G. F. Dickson, Esq., in 1842, who presented it to the Earl of Burlington, and in whose gardens at Holker, under the superintendence of Mr. Wilson, it flowered for the first time in November, 1843, when our drawing was prepared. Subsequently it has been introduced to other collections.

In habit the plant greatly resembles some species of *Ipomœa* with lobed leaves, but the flowers are produced in forked, many-flowered racemes, a character very unusual in this Order. The individual flowers are also singularly formed, very different from those of any other plants belonging to *Convolvulaceæ;* so that, when the leaves are removed, it could scarcely at first sight be recognised as belonging to the Order under which it is placed: the structure of the ovary and stigma, however, is that of true *Convolvulaceæ.*

It is an annual, requiring the temperature of a greenhouse. The seeds should be sown in pots, and placed in heat; when the young plants have become of a sufficient size, they must be transplanted into small pots, and shifted from size to size as they advance in growth.

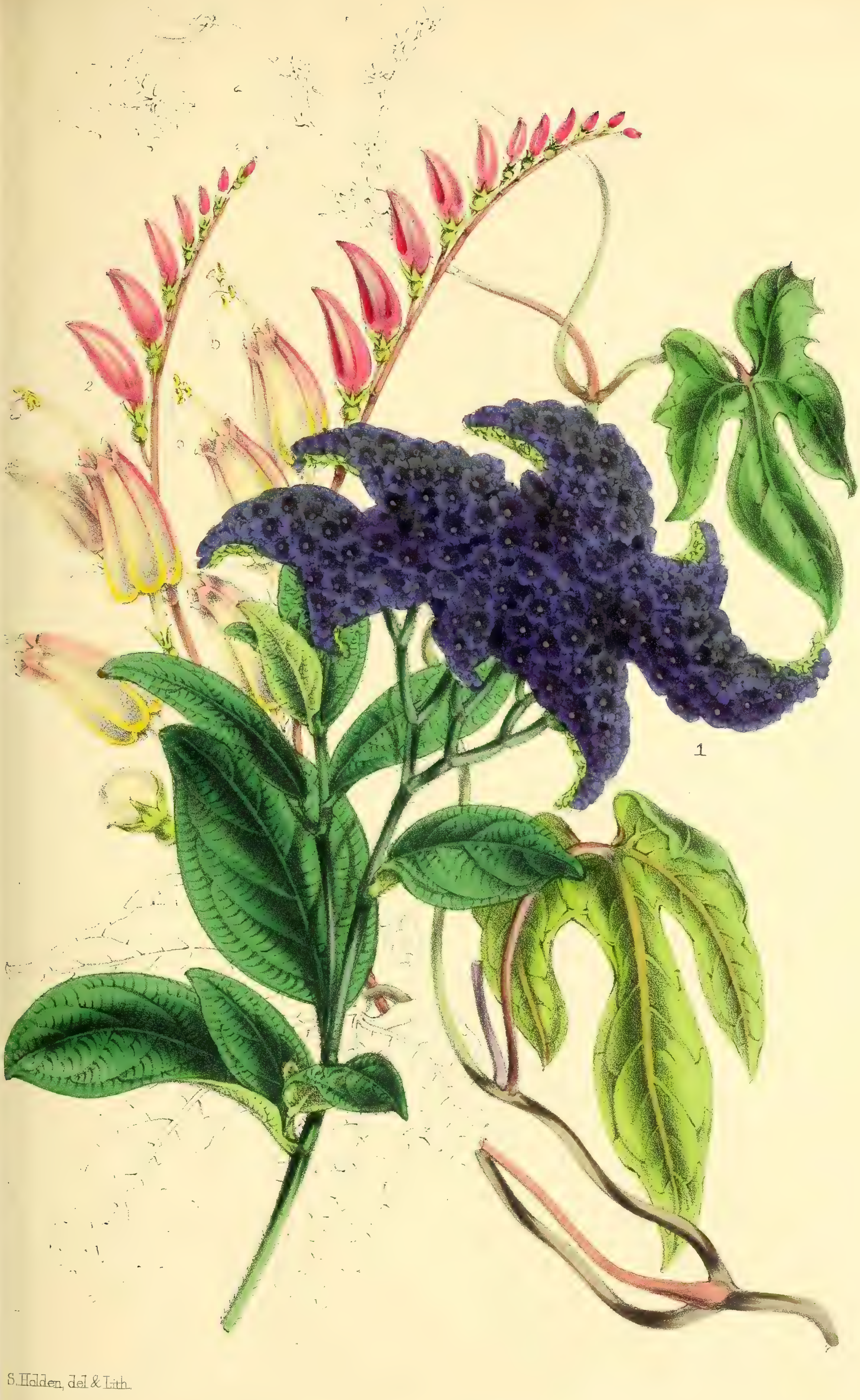
A light rich soil, composed of equal parts of loam, decayed leaves, and heath-mould, suits them best. Increase is not only effected by seeds like other annuals, but they may be likewise propagated by cuttings, separated as soon as the wood is sufficiently matured, and planted in pots of sand, and placed under a glass in heat.

The name is given in honour of Don Francisco Xavier Mina, a Mexican minister.

CHEMISTRY OF HORTICULTURE.

By John Towers, Esq.

AS an opportunity has, by the new arrangement of this Magazine, been furnished to introduce the above subject, I avail myself of it. Chemical terms are in the mouth of every cultivator; but the mere use of such, without an appreciation of their due sense and meaning, conveys little instruction. It is proposed, therefore, to enter upon a series of Chemical Articles, of which this is the leader; wherein, beginning with first principles, no one word that does not convey its own application, shall be passed over without an attempt, at least, to render it familiarly intelligible. In order to avoid error and the appearance of dogmatism, I shall faithfully appeal to the writings of some of our ablest philosophers; but while so doing, as it is admitted that knowledge, though rapidly advancing, is still far from perfect, I will not scruple to offer, by way of comment, any remark that may tend to elucidate phenomena or elicit truth, in order to induce a research of causes, and thus to establish the foundations of a consistent philosophical theory.



S. Holden, del & Lith.

1. *Heliotropium Voltaireanum.*
2. *Mina lobata.* W. Barrow del.

A variety of chemical notions have from time to time been entertained: most of these have passed away; but there is one of them which, however vaguely expressed, is capable still of being carried to good account. Chemists of the present day are constantly in the habit of employing the terms *element and elementary*, by which they imply a substance that "has hitherto resisted decomposition, or any resolution into simple forms of matter." The four great elements of the ancients were—fire, water, earth, and air. Now, without dwelling for one moment upon the absurdity of this notion abstractedly, I recur to it as leading to something like a consistent mode of arrangement. Elements they are not; but as being the great natural agents of every phenomenon which presents itself to notice amidst the boundless wonders of creation, I think we cannot adopt a safer course than to assume them as our leaders in any attempt which may be made to convey simple elementary instruction.

As concerns priority, it might be more correct to assume water as the original agent in the phenomena of creation; but if potency of action be taken into the account, fire, when referred to its original source, must claim the precedence; and so far, I presume, the Gardener will not hesitate, when I take it as the basis of that theory which has been above alluded to.

The sun is, beyond doubt, the pure original foundation of light, heat, and vitality. We know not what the sun is, nor is it at all required that any attempt should now be made to inquire into its structure or composition. The telescope has plainly shown that its surface occasionally exhibits black spots, called *maculæ;* and by my own observations, taken on many favourable opportunities subsequent to the 12th of February, I can assert that, to this day (April 2nd), the solar disk has never been free from spots, which have been found to vary much in size and position, and to an extent that must prohibit any attempt thereby to ascertain the rotatory motion of the luminary. Sometimes seven to nine have been counted; at others a single well-defined spot, with one or more mere specks, have been observed—the latter near the verge of the sphere. The only conjecture that has been hazarded from any appearances so erratic is, that the solar body may in itself be opaque, and that the *maculæ* are perforations of a luminous atmosphere which may enclose that dark central body. Persons have been led to form the erroneous opinion that the spots indicate a cold and rainy season; yet few, we imagine, can retrace finer weather than that with which we have been favoured during the months of February and March last.

The sun's light—pure white light—if passed through a good prism, is found to be divisible into seven coloured rays, which constitute the figure called the *solar spectrum.* On this point it may be gratifying to many to refer to the authority of our great philosopher, Sir Isaac Newton. He made a circular aperture of about one-third of an inch in the shutter of a dark room, and placed near it a triangular prism of highly polished glass (whose angle of refraction was about 64°), in a position to allow the beam of the sun to pass through it, and then to be received by a screen placed about eighteen feet and a half from the prism. This beam of light, if nothing had intervened, would have passed through the aperture, and proceeded onward to the screen in a straight line; but by a power which pure glass possesses, the beam, on touching one of the three faces of the prism, was refracted or bent, and thrown upon the screen in the oblong figure called a *spectrum*, whose length was about ten inches and a half, and breadth little more than two inches. The arrangement of the coloured decomposed rays, commencing from the lowest, comprised, first, the red, and then, in order above it, the orange, yellow, green, blue, indigo, and violet. It may be made matter of conjecture whether the glass itself exerts an actual chemical agency upon the passing beam or not; but such are the observable effects: and other chemical transparent substances, solid, fluid, and aërial, produce a powerful, though somewhat dissimilar effect, upon the sun's rays. It should appear, by the peculiar arrangement of the several tints, that they circularly blend and intermix one with the other; for although the coloured image, by falling upon a perpendicular screen, conforms to its flat surface, yet when it is found that the blue ray at the highest end of the *spectrum* assumes the tint of purple (called violet), it becomes highly probable that a portion of the blue ray has passed into, and blended with, the red ray of the lower extremity, and *vice versâ*, inasmuch as that red ray is not found equally pure throughout. Again, the orange, which is interposed between the red and yellow rays, partakes of the nature of both; as does also the green, which is placed intermediately between the yellow and the pure blue rays.

Philosophers assert that there are but three primitive colours—the red, the yellow, and the blue; and the theory bears out to a certain extent, *that* of the circular blending of those three basal tints.

Modern researches have partially confirmed the conjectures entertained by writers of a bygone period; and attempts have been made to regulate the introduction of light into plant-houses by modifications of the glass. That a powerful influence is exerted by the sun's light upon decomposable substances is proved by numberless facts; colours are changed,—those of growing plants particularly so; attraction is manifested, and leaves are drawn up during the greatest power of daylight, as if they were under the attraction of an electrical conductor. Of this movement, *Erythrina*, and many of the trifoliate *Leguminosæ*, may be cited as most familiar examples. Heat also is developed, though the transparent medium itself, through which the rays pass, is not sensibly affected, unless it be by radiation from a surface below, upon which the sunbeams have struck. In a word, we may safely conclude that the sun's rays invariably act as a divellent decomposing power.

We have now arrived at a position whence we can obtain a glance of the chemical and electro-magnetic principle of the sun's light. It has long been suspected that the blue rays produce magnetic phenomena, and needles have been said to be thereby converted to magnets. The blue ray, at all events, developes little heat, and it may not be incorrect to suppose that cold frosty weather may depend upon its predominant influence. The illuminating yellow or central rays may be the more immediate source of electricity; as the red was formerly supposed to be the agent of heat. But more correct experiments have proved that the greatest heating power is manifested a little below, and out of the visible range of, the red ray. In a word, keeping in view the entire range of the prismatic *spectrum*, it will be found, that, if a delicate thermometer be applied to the different coloured spaces, the heating power being at its maximum beyond the limits of the red ray, decreases gradually through the various tints till it arrives at the blue spaces, where it is at the minimum.

Chemical changes, chiefly attended with decomposition, are produced by the action of light: one only need be adduced, as familiar in domestic economy. When the common permanent ink (which consists of metallic silver dissolved in dilute aqua-fortis, coloured with a little Indian ink) is applied to linen, it is of pale brown colour, and could immediately be discharged; but after exposure to the full sun's ray it acquires a fixed black tint. In this process the solution becomes decomposed by the agency, chiefly, of the blue ray, and the silver is partially restored to its metallic condition. Now, according to Dr. Fownes, "it is not the luminous part of the ray which effects similar changes; they are produced by certain invisible rays accompanying the others, and which are found most abundantly in and beyond the violet part of the *spectrum*. It is there that the chemical effects are most marked, although the intensity of the light is exceedingly feeble. The chemical rays are thus opposed to the heating rays in their degree of refrangibility, since they exceed all the others in this respect."

According to the most recent discoveries, it should appear that white, undisturbed light, consists of at least three active constituent principles—namely those of light or luminosity, heat, and actinism. We may, perhaps, never be able to separate or define these principles; and as regards vegetable growth and maturity, it is not essential that we should do so, because softened white light imparts every element which can be required. I say *softened*, because of the evil consequences that result from the burning lenses that are found in common or sheet glass; and I use the term with a view to persuade the horticulturist to substitute *ground* glass for any screen, be the fabric what it may; because light is, and must be, intercepted by the latter, and its qualities more or less changed.

And I am also persuaded that the calamities of scalding, shrivelling, shrinking, and scorching, will become of less frequency by the substitution of a process which cannot decompose, although it may chasten, the perfect ray.

To bring this article to its close, consistently with the general object of the proposed series, I assume that every phenomenon in meteorology and natural philosophy is dependent upon the decomposition and disturbing influence of the sun's light. The electric element is distributed throughout the earth's surface; light is imparted and stored up in every species of matter which is susceptible of combustion. Magnetism and heat, if not directly imparted by the solar beams, are induced within the earth, and so, in a word, are those processes which effect the decomposition of water, and of every organic substance which constitutes manure.

ON GROWING THE LANSEH AND CARAUNDA AS TABLE-FRUIT.

The Lanseh, or Langsat of the Malayans and natives of Java, is the *Lansium domesticum* of Jack and our Botanical Catalogues, and the *Cipadessa fruticosa* of Blume and Don's Syst. It grows abundantly in the Indian Archipelago, being found both in a wild and cultivated state in Java, Malacca, Borneo, and many other of the warmer parts of Asia. It is associated with the Natural Order *Meliaceæ* or Bead Trees, a tribe of plants not generally remarkable for wholesome properties; nor are many of them safe even administered as medicine; yet the fruit of the present species, that of *Milnea edulis*, and a few others, are free from any deleterious qualities.

In its native habitats, the plant forms a tree-like shrub, from 10 to 15 feet high, with a moderate-sized stem, and brown bark. The *leaves* are alternate, pinnated, each consisting of from three to four pairs of leaflets, with an odd one; *pinnæ* ovate-acuminate. *Flowers* produced in short racemes, issuing from the naked stems and branches below the leaves. *Calyx* small, five-toothed. *Corolla* larger than the calyx, consisting of five petals. *Filaments* ten, nearly as long as the petals, emarginate, connected into a tube at the base. *Anthers* adnate inside. *Ovary* surrounded with a disk or ring, five-celled. *Ovules* ten, two in each cell. *Style* short. *Stigma* capitate, five-toothed. *Fruit* firm, fleshy, globose, five-furrowed, five-celled, five-seeded.

Next to the Mangosteen, perhaps no fruit is more universally eaten and esteemed than this; the pulp is of a somewhat firm consistence, but contains a deal of juice, very cooling and refreshing in a hot climate, being delicate and delicious, with a remarkably fine aroma. On the tables of India it forms one of the chief fruits in the dessert.

The growth of the tree is ornamental, particularly so when covered with blossoms and fruit; and although of a moderate height, it forms a fine spreading head, with light and graceful foliage, which renders it a very desirable garden object.

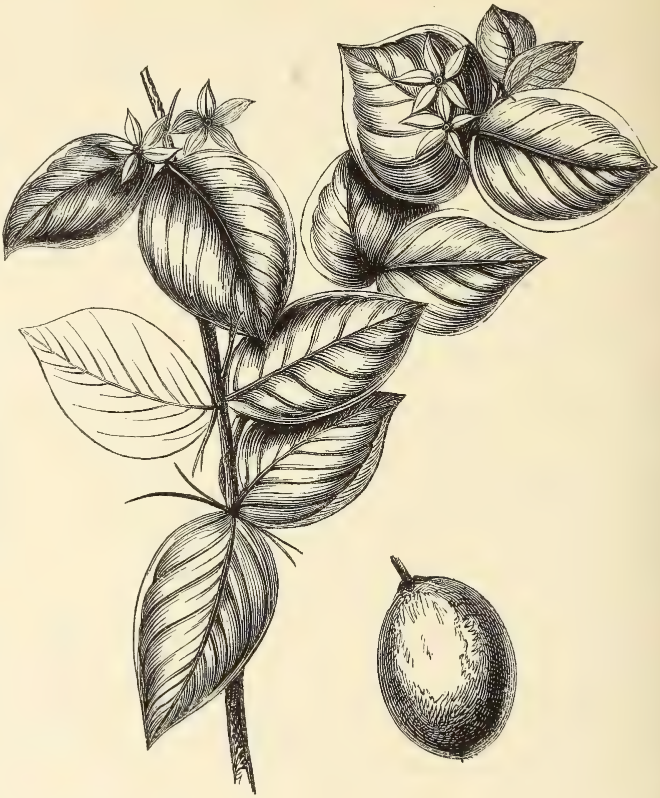
The temperature for the growth and fruiting of this plant, should be a pretty strong but moist stove-heat, and its roots should have access to a little bottom-warmth, but not in such a manner or degree as to parch and dry the soil.

During the season of torpidity, the temperature should not be allowed to fall very low; about 60° or 65° would be a fair average.

If grown in pots or tubs, abundance of root-room should be given, otherwise the growth may become stunted; but it would no doubt be better to plant it out, in a prepared border, in a rich loamy soil mixed with coarse sand to keep it open; but if grown in pots, a mixture of peat, loam, and sand, with a little well-rotted manure, is requisite, taking care that the drainage is good. Cuttings will strike in sand plunged in heat.

The Caraunda or Caranda is the *Carissa Carandas* of Linn. and our Botanical Catalogues, the *Capparis Carandas* of Gmel. Syst., and *Echites spinosa* of Burm. Ind. It is a native of the East Indies, growing chiefly in wild woods and uncultivated places.

It belongs to the Natural Order *Apocynaceæ*, or Dog-banes, some members of which Order, although plants of considerable beauty, are classed amongst our most deadly poisons. Our present subject, however, and several others, bear eatable fruit, possessing considerable merit, amongst which may be mentioned *Willughbeia edulis*, *Hancornia pubescens* and *speciosa*, *Carpodinus dulcis*, or Sweet Pishamin, and *Melodinus monogynus M. Baueri*, and *Carissa edulis*.



In its native country this plant forms a spreading shrub 15 or 20 feet in height, and flowering during the months of June and July. The *branches* are numerous, slender, and forked. *Leaves* opposite, ovate-mucronate, obtuse, glabrous. *Spines* in pairs at the divisions of the branches, and at the axils of the leaves, often two-forked. *Corymbs* terminal and axillary, few-flowered. *Flowers* jasmine-like, fragrant. *Calyx* five-toothed. *Corolla* funnel-shaped, with a five-parted limb and naked throat, white, slightly tinged with rose-colour. *Stamens* five, inclosed. *Ovary* two-celled, cells few-seeded. *Style* thread-like. *Stigma* bifid. *Fruit* a two-celled, four-seeded berry, about the size of a cherry, black and shining when ripe.

The cherry-like fruit of this shrub is, when ripe, almost universally eaten, both by the natives of India and by Europeans, and when preserved they form an excellent substitute for our red-currant jelly. Previously to becoming ripe, they are either eaten with salt, or pickled; for this last purpose they are thought to be superior to any other fruit in India, even the Mango is considered inferior for this use. In the unripe state they also make excellent tarts, and are manufactured into various kinds of preserves.

The growth of the shrub is bushy and spreading; in Bengal it is formed into hedges, which growing strong, and forming a dense thicket with the branches in addition to the strong sharp spines, the fence becomes all but impossible to pass through. The plant has been long introduced to this country, having been cultivated in 1790, but is now seldom met with in Collections. It is well worthy of a place in every stove, only for its ornamental character and the fragrance of its flowers.

It is easy of culture, requiring the heat and treatment of common stove-plants, and to be potted in a mixture of peat, loam, and sand, with good drainage. It is readily increased by cuttings of the half-ripened wood planted in pots of sand, and placed under a glass in heat.

ON SEVERAL SPECIES OF FICUS, INCLUDING THE FICUS CARICA, OR COMMON FIG.

The genus *Ficus* contains several very interesting subjects, and the fruit of one is of much importance as an article of commerce. The sap of the whole genus is milky, with more or less of acridity, and contains in some species a large proportion of caoutchouc. Amongst those which bear eatable fruit may be mentioned *Ficus Carica*, or the Common Fig; *Ficus Sycomorus*, or Egyptian Sycomore; *Ficus religiosa*, or Pagoda-tree; *Ficus pumila*, *F. benghalensis*, *F. aspera*, *F. auriculata*, *F. Rumphii*, *F. Benjamina*, and *F. Granatum*.

Ficus elastica, or Caoutchouc Fig, is a strong-growing tree, with large leathery leaves; the sap contains a considerable portion of caoutchouc, and the chief supply of this article brought into Europe from the continent of India is obtained from this plant.

Ficus indica, or Banyan-tree, was introduced to this country so long ago as 1690, and has always been treated as a stove plant; it grows strongly, and becomes in its native country a very large and spreading tree; some of the specimens in the neighbourhood of Calcutta are of great age, and of an immense size, and excellently adapted for the convenience and comfort of the inhabitants in that warm climate, who spend much of their time in the open air, even in their various occupations; weavers, tailors, and other tradesmen, may be seen under the shade of these wide-spreading trees, following their usual occupations. The lower branches of this species of Fig are extended laterally to a great distance from the bole, and produce abundance of roots, which, descending, fix themselves in the ground, and become in their turn stems, and as the side branches are more lengthened out than the central ones rise in height, the tree at half-a-mile distance appears like a depressed cone, and the stranger could scarcely believe the regular ranks of stems before him were merely parts of a single tree, until he arrived beneath it and witnessed its complication of stems and branches, placed in ranks of concentric circles around the main stem. One of these trees, 200 years old, is reported to have been so dwarfed by the Chinese as to only rise 2 feet in height.

Ficus religiosa, or Pagoda Fig, bears an eatable fruit, although the tree is chiefly esteemed for the use made of its timber in the manufacture of idols. It forms a large tree, without any disposition to emit roots from its branches like the last. The leaves are like those of the poplar.

Ficus repens, a native of the East Indies, forms one of the best creepers, planted in rockwork, in a stove. In the large conservatory at Chatsworth it is found to spread with great rapidity, and is an excellent covering for what would otherwise appear a mass of cold, naked stones; it adheres to them without difficulty, and is very ornamental.

Ficus Sycomorus, or the Sycomore Tree of the Ancients.—This species of Fig grows abundantly in Egypt, Arabia, Palestine, and the neighbouring countries, on which account the tree has been named by some travellers and writers, *Ficus ægyptiaca*, or Egyptian Fig. In ancient history, however, both sacred and profane, it is called the "Sycomore," a name derived from *sycos*, a fig-tree, and *morus*, a mulberry, from the circumstance of the leaves and general growth the of the plant resembling the mulberry, but the fruit being a true fig.

The fruit of this species is esteemed next in value to the Common Fig, *F. carica*, but both in flavour and richness it is very inferior; for the milky juice is of so acrid a nature, that, if the fruit be eaten in an unripe state, it is very liable to excoriate the mouth; and even when ripened in the ordinary way, they do not entirely lose the acridity, and are considered only fit for the food of pigs. For the purpose of rendering them wholesome, they undergo caprification, by which operation the acrid milk is converted into sugar. Pliny, and other writers, mention this operation as being performed by injuring the point of each fruit, either by cutting off a piece of the end, or running an instrument into it, and by this means producing a wound. Amos, the prophet, was a gatherer of this fruit, as we see in Amos vii. 14; and that the trees grow to a considerable size in Judea is evident, this being the kind into which Zaccheus is said to have climbed to get a view of the passing Saviour. Luke xix. 4.

These trees, in their native countries, produce large timber, having trunks from 4 to 5 feet in diameter; and when fully matured the heart-wood is considered so hard and indestructible, that for ages it has been thought to be the best kind calculated for coffins and mummy cases, and some of these latter have been found in a state of good preservation, which have lain for upwards of 3000 years.

Ficus carica, or Common Fig, is too well known to need any description. It is a native of the south of Europe, and has been long naturalised in Egypt, Palestine, Arabia, Barbary, the Isles of the Levant, and many other parts, and we learn from ancient history that they formed an important article of food amongst the inhabitants of all the countries in the East. In their wild state they become large spreading trees, and bear a profusion of fruit of the finest kind.

With a few exceptions, however, Figs scarcely succeed well in this country as standards; our variable climate, and deficiency of solar light and heat, rarely allow of the wood coming to maturity, so that the fruit are apt to fall prematurely, yet in fine summers exceptions occur to this rule, and in the South, and South-west, Fig Orchards are to be found, and, with few failures, good crops are secured, so much so as to render the experiment profitable.

The usual method of growing the trees in this country is against walls, where in general crops of very good fruit are ripened. The aspect best suited for the purpose is South or South-east, and it must always be borne in mind that the Fig-tree is a very rampant grower, and it is therefore advisable never to make the border very rich. Obtain a quantity of good turfy loam, mix with it about one-sixth of brick and lime rubbish, but add no animal manure; whatever is required of this kind can be added afterwards in the form of liquid manure, otherwise the shoots will make such rapid growth, and become so long-jointed, that fruit need scarcely be expected.

The border may be prepared to about the depth of 3 feet, and may be extended to 10 or 12 feet in width; for drainage lay a large quantity of hard dry rubbish, much in the same manner as for vine borders. Some cultivators think it advisable to build walls beneath the ground, leaving the roots of each tree about 9 feet square of soil in which to grow; but as a rule, this seems scarcely necessary, although in some situations it might be found expedient. Any superfluity of growth may always be remedied by judicious root-pruning; and fructification is induced by continually stopping the young shoots at every few joints with the finger and thumb, which is preferable to using a knife. Root-pruning may be easily accomplished by forcing down a sharp spade or other tool, and cutting off the roots at about three feet from the stem of a large tree, and two feet from the stem of a smaller one. This should be done early in autumn, and they will form new rootlets for Spring.

Of the different modes of training, perhaps, the fan system is the best. The use of the knife is seldom required, except to cut out the large old wood; lay the shoots in thin, and by paying attention to stopping the young shoots at every few joints during the summer, a large crop of fruit will be induced to form. The nearer the roots of the trees are brought to the surface, the better will be the flavour of the fruit, and the earlier will they ripen; it is therefore advisable never to dig the borders near the trees with a spade, for, by this means, all the surface-roots will be destroyed, and those only which lie deep and are of the least importance will survive; let the earth be loosened with a fork in such a way as not to injure the roots more than can be avoided.

If the trees are in good health, and yet do not bear fruit, cut out a trench three or four feet from the stem, and separate some of the main roots, then fill up the trench again with lime rubbish nearly to the surface, after which spread the soil; by this means, the growth of the roots will receive a check, a number of rootlets will be formed, and fruitfulness will be induced. A practice sometimes is followed of removing or shortening the leaves of the young wood when they hang over or conceal the fruit; whenever this is practised, the contiguous buds remain immature, and unfruitfulness is the consequence. The fruit often swell well and then drop off; this either arises from a too sudden exposure to great cold, or from the wood being unripe. The leaves are generally killed by frost, this ought never to be; for whilst the leaves remain green, the wood is immature. The young fruit may be preserved through the winter by covering the trees with double mats from the effects of the early autumn frosts, until the young buds are perfected.

Propagation is effected by layers and cuttings about a foot long, taken off the most fruitful and well-ripened shoots, planted in pots of sandy soil, and placed in a gentle heat; they bear fruit the second year.

The best kinds for walls are—

White Marseilles.
Black Ischia.
Brown Ischia.
Brown Naples.
Pregussata.
Lee's Perpetual.
Large Blue, or Long Purple.
Brunswick.
Brianzolo.
White Genoa.

The *White Marseilles* is an excellent fruit, with a rich honey-like sweetness, and pleasant flavour, but is of a small size. The tree does not grow strong like some other kinds, and is a most profuse bearer.

Black Ischia. A deep violet fruit of moderate size and good flavour. The tree is of strong growth, and sometimes requires pruning at the roots, especially if the soil be at all rich, otherwise it becomes long-jointed, and the wood does not ripen. It is hardy and seldom suffers from our winters.

Brown Ischia.—One of the best wall Figs we have, both in respect to the production of fruit and its flavour. The fruit also becomes of a good size in favourable situations, but the tree is apt to grow succulent and long-jointed, if planted in too rich a soil. This, however, can be remedied by root-pruning. The fruit ripens in succession, after the manner of Lee's Perpetual; the colour is brown, with a purple bloom on the sunny side.

Brown Naples.—A large fruit of the first quality, and of a brown colour, tinged with blue on the sunny side. The tree grows strong, and the leaves are large: it is, therefore, necessary to keep the wood very thin. The roots, also, must be kept within bounds by pruning; otherwise, it is not a good cropper.

Pregussata.—This is a small, dark, blue Fig, of a first-rate quality. The tree is not a strong grower, and, therefore, requires less room than some of the others. A south aspect is the most suitable for it.

Lee's Perpetual is not, either in size or flavour, equal to some others. The tree is not a strong grower, but bears a profusion of fruit, which seldom drops; ripening continues through the whole of the season, until the cold autumn winds affect the leaves.

Large Blue.—A fine large fruit, making an excellent figure in the dessert: but the tree seldom bears a large crop; and the flavour of the fruit is not equal to some of the smaller kinds. The tree is also of very vigorous growth, and will outstrip all bounds, if the soil in which it is planted be rich.

Brunswick.—A good wall fruit, of a large size; but, like the last, the tree seldom bears a good crop. The fruit, however, is superior in flavour to the Large Blue, and the tree is more easily kept within bounds.

Brianzolo is, perhaps, the best-flavoured Fig grown. At present, it is too little known to cultivators. The tree is a profuse bearer, and should be planted in a warm situation. The fruit is small, of a bright yellow green, with the inside of a bright crimson.

White Genoa is a large Fig, of good quality. The tree grows strong, and bears very fine crops; but the roots require to be pruned, and the shoots to be laid in very thin.

The winter management of the Fig tree merely consists in keeping the borders pretty dry; and, by a covering of long litter, preventing the frost penetrating to injure the roots.

Caprification, or artificial ripening of the fruit, is a system followed in some parts of the Continent, in imitation of the perforations of an insect, which is thought to greatly facilitate the fruit coming to maturity, by causing "the nutritious juice to extravasate in those vessels, which they tear asunder in depositing their eggs; or, perhaps, it leaves behind it some sort of liquor, proper to ferment greatly with the milk of the Fig, and make the flesh of them tender." When the fruit swells well, and then drops off, it has been found that moistening the eye with a little olive-oil will assist the swelling up and ripening; but the usual method is to pierce the crown of the Fig, when it has acquired about two-thirds of its size, with a needle, and insert a drop of olive-oil.

The best time to gather the ripe fruit is early in the morning. Allow them to lie in a warm, dry place, a few hours before they are eaten, when the flavour will become delicious.

M. German, a botanist of Algiers, states that a curious discovery has been made by General Lamoricière, who, seeing a quantity of Fig-peelings thrown about the streets of Mascora, had them collected and thrown, in a heap, outside of the town; and on subsequent examination, he found a sort of sugar produced upon the heap by the heat of the sun, causing fermentation. To obtain sugar from them, the fruit are divided into two, and are exposed to the rays of the sun, and the efflorescence is removed with a soft brush.

As a forcing fruit, no plant is easier of management than the Fig; and, perhaps, no crop is more certain. They may be either placed in pots and tubs, or planted out in a prepared border.

The sorts calculated for growing under glass are, Brown Turkey, Figue Blanche, Lee's Perpetual, Marseilles, Nerii, Pregussata, Fico Brianzolo, Blue Marseilles, Angelique Blanche, and White Ischia.

When planted out, it is advisable to confine the roots within certain limits, or prevent their over-luxuriance by root-pruning. They do very well in a Vinery or Peach House, provided plenty of sun-light can be given them; otherwise, they will not bear a crop of fruit: for although many may be formed, they are almost certain to fall prematurely.

Plants grown in pots or tubs should be supplied with a rich soil, composed of two parts rich maiden loam, with plenty of fibre, and one part very rotten dung. Drainage is of great importance; for, although the Fig requires a deal of water when in a growing state, yet, unless the drainage be good, the growth of the fruit will be interrupted, and they are then almost certain to fall.

The time of potting is early in the winter; after the wood is ripened, reduce any of the balls that are matted, and replace them in pots or tubs that will allow of a good growth. Place them in a warm situation out-of-doors; shelter the pots or tubs with litter, to keep the roots secure from frost; but, except in seasons of great scarcity, the stems and branches are better fully exposed. In January or February, the plants may be taken into the forcing-houses or pits where they are intended to be grown. Some cultivators, however, prefer plunging the pots in a bed of leaves, tan, or other heating material, which will supply about 10° more heat to the roots than the tops, until the fruit begins to swell and the growth has fairly started; they then remove them to the situations they are intended to occupy for fruiting. This system of treatment has been supposed to prevent the young fruit from prematurely falling; and, perhaps, there are good arguments in favour of the practice—although the best crops of Figs in pots we ever witnessed, were annually produced without any such precaution; the pots being placed at once upon and around the flues of a Vinery and Pine-stove, where the tops came near the glass, and received a deal of light.

When the plants have got into full growth, water with liquid manure about every other day; and if saucers be placed beneath the pots, so much the better. At all times, water freely during the season of growth, both at the roots and over the foliage, by syringing: for if there is good drainage, no danger need be apprehended that too much can be given, as the Fig is nearly an aquatic. Whilst the growth is feeble, however, it must always be borne in mind that a much less portion of water is required than when the plant is in full vigour. A want of attention to this is one of the main causes (although there are several others) why the young Figs fall before they are full-grown or ripened. But with judicious management of temperature and watering, two crops may be ripened in the season. When the fruit are ripening, it is always well to discontinue syringing, as it is almost certain to cause the fruit to burst with repletion; and they are never of so good a flavour when such is the case. When the young shoots are about five inches long, pinch off the ends: if this practice be followed, no pruning will be required in the winter, beyond cutting out the old worn-out wood.

If a house is appropriated to the growth of this fruit, the temperature, at the commencement of forcing, may be about 45° or 50°, and should be allowed to rise gradually, as the trees develope themselves, much in the same manner as for Vines; the treatment of which (with the exception of the Fig requiring more moisture) may be taken as a rule.

NOTES RELATING TO THE HISTORY, DISTRIBUTION, AND CULTIVATION OF THE PÆONY IN CHINA AND JAPAN.

Translated from Original Chinese Works, into Dutch, by D. I. Hoffman, of Leyden; and again translated from the Dutch, by Mr. Polman Mooy, of Haarlem.

HISTORY AND DISTRIBUTION OF THE PÆONY IN JAPAN.

(Continued from Page 89.)

Of *Botan* roots' bark for medical purposes, the provinces of Yamásiro and Yamáto bring the largest supply to market, and the district of Nara, in Yamáto, produces the most esteemed flowers, from whence the plants are distributed all over the country; and not seldom, the wealthy individuals lay out some hundred ounces of silver, for the purchase of one single plant. In consequence of the continual raising of new flowers, the number of different varieties at present, amount to one thousand, the names of which, space will not allow us to mention.* The most esteemed of recent date is the one called Thousand-petals, being very full, double, and of a vigorous habit; its flowers are furnished with the most brilliant scarlet of the Granate-flower (*Punica Granatum,*) and measures six-tenths to eight-tenths of a foot (18 to 24 centimetres) across, and its pistillum is of a solid substance; as in succession to the foregoing, the white sort in point of beauty must be done justice to. Amongst the most striking varieties, belongs one with purple white-striped flowers; another with flowers pure white about the base of the petals, and red at the edge; also the black Pæony, *Kuro botan*, the "Winter Pæony,"† &c., &c. Generally speaking, the white and red self-coloured varieties are much more esteemed than the variegated coloured ones; pure yellow sorts have however, up to the present time, not made their appearance, which the Chinese author Sëe Chaóu Ching also states, bringing, however, into question what colour Ngan Yang Sew, (the author of the "Chinese Monograph of the Pæony") may have alluded to, when using the word *Hioâng*, "yellow," mentioning the yellow varieties, *Yaô* and *New kia*,‡ grown by the nurserymen.

TREATISE ON THE CULTIVATION OF THE PÆONY AFTER JAPANESE GARDENERS' MANUALS AND VARIOUS OTHER WORKS.

The Preparation of the Bed.—In preparing the Pæony bed, the nature of the soil as to its moisture and drainage ought to be a point of particular consideration. It ought to be observed that this plant prefers a cold climate, and extremely dislikes any degree of heat. A rather dry soil proves beneficial to its growth, and it cannot resist any superfluous moisture, which particularly proves destructive to the red-blooming sorts; for the plant, when once attacked with rot about the roots, not seldom suddenly dies away. Nothing so much improves the vigour of its growth as a supply of fresh and well-manured soil, and a place situated towards the south should be chosen for the bed, such that a covering may conveniently be constructed to protect the plants against the heat of a burning sun, from which they soon suffer.[*] The bed, when made three to four feet broad, will allow sufficient space to plant two rows of middling-sized plants. Should the plants, however, be of extra large size, the bed must, of course, be made accordingly.[†]

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* The "Gardener's Manual," before mentioned, "*Kwa dan dai zen,*" contains a catalogue and description of 18 white, 42 red, and 10 pale purple-coloured Japanese varieties.

† The Winter Pæony (Jap. *Fugu botan*, or *Kan botan*) flowers from the 10th to the 12th month, (from November to January). The "Jap. Almanack," "*Gwats rei fak buts zen,*" tom, x., p. 21.

‡ To be compared with what has before been stated.

The bed should be made half-a-foot elevated above the surrounding path, which is a rule of the greatest importance, particularly so in badly drained places; (in very wet places, Ito Ifei [‡] advises the bed to be made at an elevation of one foot). Around the bed a low frame of small bricks must be constructed to fasten the covering upon, which might also be made of wood, but for that purpose chestnut wood should be avoided. From a bed after the above description, the old soil should be dug out, and again filled with a mixture of black peat, well-rotten leaf-mould, and common garden soil, in equal proportions, which should be sifted and thoroughly mixed through. When afterwards the plants are transplanted, a fifth part of ashes from burned straw should be added thereto. A mixture consisting of soil dug from the surface of an orchard, sand, and common garden mould is also considered to make a good compost.

The Planting and Transplanting.—The improved Pæony should be often (once a year) transplanted, for if this be neglected, in the sixth or seventh season a stoppage of bloom will be inevitable. (It will easily be observed that the word "planting," made use of here, means what we should call, "changing the soil.") The time preferred for transplanting them, is the last day previous to the autumnal equinox, or the day following. Should the weather, however, prove hot, it may be done a few days later. In transplanting, the old soil should entirely be removed, and the new soil (which should previously be prepared for the purpose) should be applied. The Japanese peasantry give to such performance the name of *tsoetsi-gari,* "change of soil." Particular care should be taken not to injure in any way the young and tender fibres; and, after planting, the soil should not be pressed down with the feet, as practised with other plants, but should be left quite loose around the plants.

About the annual transplanting of the improved Pæony, known by the name of *Botanno newake,* "division of the roots," we find in the "Japanese Encyclopedia," tom. 93, p. 6, and also in the "Japanese Imperial Almanac," "*Gwats rei fak buts zen,*" publication of 1804, tom. 8, p. 29, stated that this performance belongs to the operations of the 8th month (September).[§] This prescript is as follows:—Take a quantity of river-bog, which, after being dried, should be thoroughly sifted, together with a quantity of old garden-soil and silver-sand, in equal proportions. In the 8th to the 10th month (7th Sept. to 6th Nov.), after the plant has formed its red buds, it should be planted in the above-described mixture; the use of animal matter as manure has proved to be injurious. In winter-time a quantity of rape-seeds, from which the oil has been pressed out, may be deposited about the roots; also a sprinkling with water in which fresh sweet-water fish has been washed, is considered beneficial to its growth. The *Aki botan,* or improved Autumnal Pæonies, are (as stated in the above-named "Almanac," tom. iv., p. 30, planted or transplanted during the 4th month (May), and are watered every night, as are also the following plants, viz.:—

Acorus gramineus. Jap. *Seki sjo bu.*
Eryobotrya japonica, *Sieb. et Zucc.* Jap. *Biwa.*
Begonia grandis, *Ougaud.* Jap. *Siu kai dô.*
Olea fragrans. Jap. *Katsura.*
And the different sorts of Acer, *Karede,* and of Chrysanthemum Indicum, *Kikr.*

Ito Ifei [||] advises the Pæony-growers at Jeddo to manure with a mixture of black and red soil in equal portions, with a little sand. He states that, in transplanting, every kind of dirt is used as manure; which, being deposited around the roots, gives a favourable result; also the ashes from burned fowl-dung, when buried under ground for three months, and then deposited around the roots in small quantities, proves excellent. Dirt, not well-rotten, liquid manure, and urine, he disapproves of, particularly for red-blooming sorts, as the evaporation of salt, which originates therefrom, makes the flowers discolour.

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[*] This statement taken from a Chinese work, "*Hwapoo,*" is also found in the "Japanese Encyclopedia."

[†] "*Kwa dan dai zen,*" or "Treatise upon the Cultivation of Flowers," by the florist Kwakiuken Sjuzin Miyako, 1756, publication of 1788.

[‡] A description of the Japanese ornamental plants and their cultivation, entitled "*Tsi kin seô,*" or the "Earth's Attire," illustrated by Ito Ifei, Hortulanus at Jeddo, published in 1710—1719, 20 volumes in 12mo, tom. vi., p. 10.

[§] The day of Autumnal Equinox is a rest and holiday in Japan.

[||] In the work before referred to.

Cleaning of the Plants.—It is the custom in Japan to clean the stems of the plants after the leaves have dropped, and when the rainy season commences, the moss, being apt to settle along the stems, is removed by the use of some kind of spoon made of willow-wood; such being done, the stem is neatly rubbed with a piece of linen containing well-bruised Camellia-fruit, in order that the oily matter therefrom, penetrating the linen, may give a glistening appearance to the outer skin. During this performance, care should be taken not to move the roots about; and it should not be often repeated, as such might injure the plant.

The Winter-covering.—The beds where Pæonies are planted, are covered with stable-straw or horsedung, to protect the roots against the severity of the season, and the stems are covered with mats; both protections should, however, be removed at the commencement of the 2nd month before the mildness of the season sets in. Ito Ifei also advises to cover the bed with horsedung, but disapproves of the covering with mats, which he states, often causes the stem to wither in the spring following; or weakens the flower-buds so much, that they easily drop off.

The Rain and Sun-covering.—The custom to cover the Pæony flowers with an oil-papered frame, has its harm as well as its advantage; it appears very advantageous to expose the flowers fully to the morning sun, and the cover should, at that time of day, be always removed; but again, it appears that the flowers suffer from the sun not bestowing its heat upon them quite pure, but always mixed with the evaporated oil-damp. Every individual amateur should take these two facts into consideration, and judge for himself which is to be preferred; it, at all events, is quite clear that all sort of covering is injurious, unless a longer duration of floral beauty be wished for. After the advice of Ito Ifei, the Pæony bed ought to be covered with straw mats during the blooming season, which should be replaced with light boards, in case rain falls. Oiled paper he at all times disapproves of.

The Winter-manuring.—Somewhat before or about the middle of winter (21st or 23rd of December), the soil is carefully dug out round about the roots, and a quantity of powder composed of sulphur and drupstone,[*] of equal portions, is strewed about them, and the roots are again covered with the old soil. This performance is said to produce a more perfect development of the flowers. According to Ito Ifei, the Pæony plants should be manured twice a year, and no more; for if over-manured, they get a sickly appearance, and the flower-buds rot and drop before they have attained sufficient power to develope.

Treatment of Sickly and Tender Plants.—Sickly and tender plants should have little or no manure, but should occasionally receive a sparing supply of rain-water, which must have been exposed to the heat of the sun previous to use, for twenty-four hours, and mixed with a little urine. All plants rather backward in growth should not be manured; but should be planted in a rather rich clay. Should the soil of itself prove already rich, it must be observed that no manure is wanted, neither should, in that case, any rape-seed be applied.

Removal of Vermin.—To protect the roots from the attack of worms, a powder from *Pih lëen*[†] roots may be mixed with the soil; the holes which they leave behind should be filled up with sulphur, and should afterwards be shut up with pins made of Cypress wood. The rain-worm is easily removed by occasionally applying a little urine and water about the roots. If a worm has settled within the stem, the latter may be placed on one side down to the centre, when the worm can be destroyed by the use of a bamboo-needle; the stem will, by so doing, be saved, and the wound thus made, will soon cure of itself. Some white-coloured insects sometimes stick in considerable quantity about the outer part of the stem, they may, however, be easily brushed off.

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[*] The drupstone from Satsuma is considered the best. The drupstone is a congealing of the stone-sweat, met with in grottos, from the upper part of which it hangs off like icicles.—The "Jap. Conversations Lexicon," "*Fak buts zen,*" p. 314, under "*Sjô niu seki.*"

[†] *Pih lëen.* 白歛 Jap. *Bjakren* ("Jap. Enc.") Nitis pentaphylla, *Thunb.*

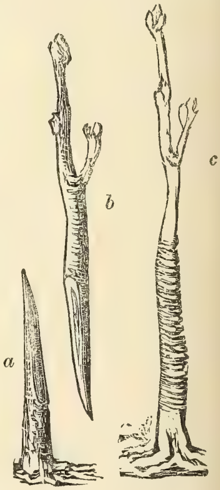
PROPAGATION OF THE IMPROVED PÆONY.

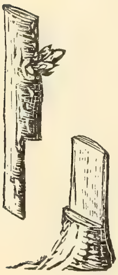
Propagation by Seeds.—The bed purposed to receive the seeds, should be prepared accordingly during the summer previous to sowing, (June to July); the seeds should be sown immediately after they are ripe, viz., as soon as the seed-vessel commences to open and to show its seeds from within. When sown immediately after, no vital power will be lost; if, on the contrary, the seeds are dried previous to sowing, hardly one in a hundred will germinate, and often not even one. After sowing, the soil should be kept sufficiently moist, and the seeds, which are usually two together, should be covered with a hollow tile, which can be removed as soon as the young plants make their appearance in the next spring. When treated in this way, the seeds ought to germinate eight to nine out of ten, and those that remain dormant in spring, may still germinate the following autumn.

Remarks.—Some cultivators crack the outer shells before sowing, by knocking them slightly with a wooden hammer; the germination is also much facilitated by wetting in the two opposite parts of the skin, and by laying them to soak in water for several days. The young plants from seed should not be transplanted the same year, but remain untouched until the second year, which anticipates flowering. Ito Ifei also advises the seeds to be sown (immediately after they prove sufficiently ripe) in earthen pots to the depth of two-tenths of a foot, (6 centimetres), and not less; for otherwise they do not germinate. During the spring, water should now and then be given, and during summer the young plants should be protected against the heat of the sun by straw mats; towards the end of the 8th month (September), they are transplanted into the flower-garden, and in the third year, they begin to produce flowers. Should flowering for the first time commence several years later, the flowers will be all the finer and better, and the contrary will be the case when blooming begins earlier.

The "Japanese Encyclopedia" fixes the time of sowing equally as above stated, and says that the most magnificent flowers are generally raised from seeds. Their propagation may also be performed by way of grafting, the application of which, upon the improved sorts, has only since the beginning of the eighteenth century begun to be practised, and has not a little contributed to the general distribution, of the most brilliant and remarkable flowers. The Chinese have known this art for many centuries, for Soo Sung mentions it in his physical work, (1023—1063).

First Method, (*Propagation by way of Joining,* "*Tsugo*").—Cut with a sharp knife the stem of a single-flowering common Pæony, two-tenths of a foot (6 centimetres) above the surface of the ground, in the way as shown by figure *a*. Take then a well-ripened branch of an improved sort, that should show three to five buds, and cut it in the way as shown by figure *b*. Unite afterwards the two parts as represented by figure *c*, and place two hollow tiles so as to form a pipe around the united spot, fasten the same by twisting a good length of mat around it, and fill the interior space between the operated part and the tile with good garden soil; in the next spring the tile-dressing may be removed and replaced by a piece of mat only.*





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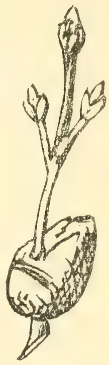
* The Tree Pæonies received from Japan in 1845, at the Botanical Garden of Leyden, (see the "Annals of the Royal Society for the Encouragement of Gardening in the Netherlands"), had, according to Mr. Schuurman Stekhoven, the Hortulanus' statement, generally been grafted in the way as represented by the adjoining figure.

Second Method (*Grafting on the Root*).—When the root of a Common Pæony has grown to the size of a Brassica Rapa root, it may be considered as fit to graft upon; a branch of some desired improved sort should then be cut three-tenths to four-tenths of a foot (9 to 12 centimetres) in length, and at the lower end be cut of an axe-like shape; the top part of the Common Pæony stem should then be split, and the axe-like shaped branch carefully brought between the splitted part; the grafted part should afterwards be surrounded with a quantity of rich clay, and the operation is completed. This method is called *tsugu mono*.

Third Method.—Bore a hole through the bulb of a *Sato imo* (root of Caladium esculentum) with a branch of *Kutsi nasi*, Gardenia florida; put a branch of the Pæony to be propagated through this hole, leaving a part of the lower end 6 to 7 bun (nearly 2 centimetres), out, in the manner shown in the adjoining figure; the bulb as well as the underpart of the branch should then be covered with well-prepared soil, and thus left during the whole of the following summer.



Propagation by the Roots.—The improved Pæonies may also be propagated by cutting the roots in pieces, and laying them in pots covered slightly with good garden soil; after a little time they easily form new shoots.

Time of Flowering.—At the ninety-ninth day (2nd of May), the improved Pæony generally begins blooming; the more common sorts, however, bloom about ten days earlier; the time of flowering also depends upon the situation of the country and the province where they grow. Between our capital Miyako and its environs, we already find a difference of two days, and the provinces Setsu (Ohosaka) and Halima, are two days earlier than Miyako.

Also at Ise and Owari the blooming time is earlier, commencing usually at the eighty-eighth night (30th of April to the 1st of May). At the environs of Suruga (the southerly declivity of the Vulcan Fusi), the blooming time falls six or seven days earlier than at Miyako; and the country of Tsikuzen and Tsikugo, on the isle Kiusiu, are five days before the capital. At Nara, again, in the mountainous district Yamáto, it also takes place five days earlier; and at the upper part of the provinces Kaga and Yetsigen five to seven days earlier than at Miyako.

When in spring the flower-buds begin to swell, it is soon to be observed that three to four in ten shall not develope to blooms; these weak-looking ones should immediately be cut away, in order that the remaining buds may not be weakened by their presence, and in that way every individual branch should be prevented from being overloaded with buds. After the blooming season has passed by, the flower-stems should be cut down, that the formation of seed may be prevented, and consequently an early exhaustion of the plants.

The Colours of the Pæonies.—White, red, and purple are the principal colours among the improved Pæonies; the varieties of which are, however, so very numerous, that several hundred sorts are thus formed.

The sorts known by the names of *Kinden*, "golden-fields," and *Do-sja*, bearing half-yellow-coloured flowers, are produced of that colour by manuring the white-blooming sort with Bjaks juts. This manure (being the roots of Atractylis chinensis is to be burned to a powder, of which a quantity of one Chinese pound (90 gros) should be strewed about the fibres of the Pæony plants, and such to be repeated five to seven times. This artificial prescript has been extracted from some old book, from which we also learn that, although Nature does not produce yellow-coloured Pæony flowers, yet they may be made of that colour by enveloping the flowers of white Pæonies twice a-day with a piece of paper containing some yellow-coloured dye;* this performance should be continued until the buds commence opening.

Pure yellow-coloured Pæony flowers are, according to the Chinese work "*Woo tsa tsoo,*"† not to be found, and plain blood-red are also most difficult to procure. A most remarkable fact is, that black-coloured Pæony flowers are also met with; and that blue-coloured flowers may be got by sprinkling repeatedly the plants with a mixture of ink and water,* from the time the buds begin to show.

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* Our Author calls this paint *Hwâng yên*, or "Yellow Ape."

† According to a note in the Jap. Encyclopedia.

The cut-flowers of Pæonies keep best (according to the "Horticultural Almanac," "*Yen si*," when cut very early in the morning or at night. Some individuals burn the under part of the flower-stem and cover it with wax; others dip this lower part of the stem in hot water before placing them in the flower vases.

At the end of the work, the author invites all amateurs of improved Pæony flowers to choose the hour of the Serpent (9 to 11 o'clock in the forenoon) for exhibition of them; and appeals to the poet Tung po, somewhere in his work, saying—"That the floral monarchs should be visited in the morning. He who should go to see their splendour in the afternoon, cannot be considered a good judge."

ON IMPROVING OLD PLANTATIONS.

By Mr. Kemp, The Park, Birkenhead.

In a former paper, the subject of laying down new plantations on an estate, with a view to the production of beautiful and picturesque effects, was freely discussed; and it is now proposed to treat of the way in which a property that has been many years planted may be improved, by breaking up the overcrowded plantations, and admitting light into them, as well as opening out glimpses or views into the distant country.

There can be no doubt that a large proportion of the older estates of this country are, with respect at least to the district which may properly be styled the *home* scene, far too largely and densely covered with timber. But that this is a great advantage to the possessor, inheritor, or purchaser of such property, might be easily made manifest; for the work of thinning and dressing woods of this description is one which could, if desired, be all accomplished in one season, or, if distributed over several years, would both pay for itself, and the general expenses of the out-door establishment. Whereas, the cost of new planting is considerable, and the period during which trees are developing themselves properly, constitutes the greater part of an ordinary lifetime.

To the owner of a well-timbered estate, then, the improvement of his woods presents a variety of recommendations; and it may perhaps be affirmed that, if the subject were more generally and more judiciously attended to, not merely a greater amount of appreciation and enjoyment would be produced, but many fine places which, from the reduced means of the proprietor, are suffered to fall into decay and ruin, might be kept, through the sale of the timber, in excellent order, and even contribute something towards other objects.

While, however, the treatment of old plantations is an easy matter as far as labour and time are concerned, there is no process in ornamental gardening which requires greater care, deliberation, and skill. The common observation that a tree, once removed, cannot be replaced, is not less true and important than it is trite; even when in the midst of a large plantation, single trees may sometimes be of the very greatest consequence, by relieving the outline of flatness and monotony. But in proportion as they come nearer to the border of an opening, or stand towards the front of the group, or occupy any position between two masses, they become additionally important, and it is increasingly necessary to deal with them individually.

Any common woodman can cut a gap through a plantation, so as to let in a distant prospect; but it requires a practised eye, and a finished taste, to give such openings the appearance of never having been otherwise than as they are, and to retain the connexion between the masses left on either side of them.

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* The Chinese word 墨水 *Mih shwu*, which the Author here uses, signifies the Sepia, as well as the Chinese (Indian Ink) ink, the principal ingredients of which are blacking and glue.

Much of what has been said in a previous article on the mode of planting an estate, is of course applicable to the present subject, especially as to principles. Still, it will be desirable, without repeating what was there put forth, to touch anew on some of the points then suggested.

The principal thing in dealing with established plantations, is to get rid of everything like long lines of them, unless these are absolutely useful to screen some ugly objects, or for shelter. And the nearer such extensive woods come to the house, they become more objectionable. Especially, however, is this the case when they shut out interesting scenery, or cramp and darken an extensive property. In such instances, they take the character of huge green walls or hedges, chiefly superior to walls of brick or stone from their more pleasing colour; but, in their best state, wretchedly monotonous and wearisome. The eye seeks in vain to get out of this prison-like inclosure, and range over the free country beyond; or, in the case of a hilly boundary, to furnish the imagination with the means of filling up the distance. But all is blank, uniform, and dark.

It is for destroying this tiresome sameness, and obtaining a varied outline, and opening up glades beautifully chequered with light and shadow, and making frameworks to the remoter pictures, that the thinning and re-arrangement of large plantations is so desirable. And besides the additional extent of view which the practice would reveal in most instances, the very separation of a large mass of trees, near the mansion, or in the middle distance, into three or four small groups, well connected by single trees, would make the part so treated, and the ground in front of it, to appear much more extensive.

To take these points, however, somewhat more in detail, the first object to be attained by the division of long plantations is to bring the trees into masses. These should be as varied as possible in regard to size and outline; both of which features must be determined by reference to the shape of the ground, and the nature of the country behind them. In a district where there is much undulation of surface, the masses of plantation should mostly be left on the swells, or on the slopes of these, and be larger or smaller in proportion to the breadth of such elevations. At some points, again, it will be necessary to admit broad and ample views of the surrounding country; and in others, narrower peeps or vistas will be most appropriate. This, of course, will be regulated by the character of the country, and the size and number of the objects that require shutting out. And all these things will help to fix the dimensions of the masses to be preserved. What it is mainly important to guard against, in this process of thinning, is that too great a number of spotty groups is not left, that they be not too similar in character, and that, in a hilly tract, the plantations retained are not all placed, like beacons, merely on the summit of each eminence. They should likewise be most irregularly disposed as regards distance from the house.

Much attention will be required in the formation of such masses to keep their outlines soft and agreeable, and to leave a sufficient number of smaller or well-furnished trees along their margins to carry down their branches, so as to sweep the ground. The edges, too, of any opening should by no means be square or straight, or have tall bare stems standing forward along them, but, as a general rule, should be indented in the middle, and have either the front or back swell stand more or less forward. This, by occasioning a greater thinness at the outer corners, will contribute to lighten the group, connect it better with any scattered specimens, and relieve it of all squareness. There may be cases, however—as in very small masses, for example—where such a rule will not apply, and where greater roundness and denseness will be an actual beauty. Indeed, it is a certain degree of roundness or freedom from angularity, which constitutes the charm of the outline of all masses reposing on turf.

Another mode in which the outline of detached masses of trees will demand consideration, is in respect to the fence by which it is inclosed along the front. Where such a fence exists, it will be a great improvement to throw it back within the margin of the plantation, leaving a few specimen trees irregularly dotted about before it, so as to conceal it from view. This plan will also afford the means of varying the front outline of a mass where it has been defective; and the fence thus moved, will be as effectual a barrier as before to cattle, or whatever it may be wanted to exclude from the plantation.

But besides the desirableness of giving to home plantations the character of masses, (which alone, in ordinary cases, are capable of producing the requisite variety, intricacy, and beauty,) there would be a hardness and an isolation about all such masses, however elegantly their lines might be rounded, were the spaces between them left entirely blank. Hence, to give the required connexion, and to soften and harmonise the whole, there must not only be specimens and groups sprinkled about in front of the plantations, but also between them. In selecting these, the improver will have to be guided partly by a consideration of what trees already exist in the parts to be cleared away, that are at all fitted for remaining as separate specimens or groups. And about twice the requisite number of these should be marked to stand at the first thinning, so that there may be enough to choose from when the finishing strokes have to be put to the work. The ultimate views on which those that are to remain should be chosen, are, what will least interfere with the character of the scene beyond, and best conduce to a good outline, and blend with the other masses. Sometimes, in a small opening, a single tree will answer the purpose of connexion; but it must be a good-shaped one, well clothed with lower branches, and by no means be in the centre of the glade, but appear as if dropped down accidentally nearer to one side than the other. If the tree be imperfectly formed, a few smaller ones left to support and balance it, and give it the requisite degree of roundness and finish, will often be useful.

In openings of a larger description, a small group of trees, with a few single ones standing irregularly around it, and between it and the main masses, will frequently have to be left. Everything like sameness or similarity, however, between the furniture of any of these openings, should be particularly avoided. A few thorns or low bushes will often answer the purpose better than trees. And where the masses are small and not very distant, and their edges are made thin, fringe-like, and diffuse, intermediate plants may sometimes be advantageously dispensed with, particularly if the ground dips slightly in the open space, and rises gently towards either edge. Broader sunny glades will thus be obtained.

And this appropriately introduces the remark, that another of the objects to be accomplished by cutting away parts of long plantations, is to break the uniform darkness of the shadow which they throw on the ground, and introduce sunny spots, which may also be clothed with perpetual verdure. During the summer, the effect of the sunlight on these varying glades, and of the shadows which the broken masses of trees throw into them, constantly changing as these will be with the advancing or retiring day, and according to the different points of the compass at which they are situated in relation to the house, will furnish a continual source of interest and diversified beauty. The lights and shadows of a landscape, of which only the general effect is usually noticed, will, if examined closely and in detail, be found full of attraction and rich in enjoyment. What is proposed, therefore, is to give to these their proper and complete development.

A further effect to be obtained by the wider diffusion of trees over an estate, is the extension of its apparent boundary. However large the property may be, long lines of plantation always seem to fix its limits. But if, on the other hand, the eye can travel delightedly through these at intervals, and take in other scenes, or simply get the line of the horizon broken in hilly parts, the actual boundary of a small place may frequently be hidden, and considerable indefiniteness of view secured. If it be objected that lengthened prospects are not so much to be sought from a house as a beautiful home scene, and that prospects are more suitably given from elevated parts of the grounds or estate, it may be replied, that the views here spoken of and sought to be introduced are only, as it were, snatches of the distant country, and not broad or expansive landscapes, without, however, admitting that these last are really unfit to be looked upon from the windows. Such portions of a remote district as can be brought into view through masses of trees, are in no way to be regarded as coming into comparison with the wide open prospects of an entire circuit of country, seen from the top of a considerable eminence. And the very masses of trees, with their various openings, which are here commended, serve to give the most wonderful variety of views into the distant country, from the many different points of observation.

Fresh and varied scenery is, consequently, another of the objects to be realised by skilfully thinning out plantations. In proportion to the length of the space over which the eye can roam, and the number and diversity of the interesting things to be met with in that space, will be the novelty, mixture, and loveliness of the many changes which the season and the atmosphere occasion. Even in one day, sometimes, from the variableness of our climate, and the partial character or localisation of many atmospheric phenomena, a widely spread landscape will exhibit the strangest and yet the most exquisite contrasts and combinations. So that it is not only the actual variety in the features of a scene which is brought under inspection by removing parts of the woody screen that had previously covered it, but that far greater and more wonderful variation which every day's and often every hour's change of weather introduces.

If, moreover, we adopt the authority of one of the first writers on landscape gardening, we should, by opening out the plantations of an estate, produce, in many instances, a feature which he regards as essential to the perfection of any scene, and which is called "the distance." This characteristic, of whatever composed, cannot, of course, be appreciable from the house, while it is obscured by large plantations occupying the foreground or middle distance; and it can only be rendered available, as part of the landscape, by the plan here recommended.

Plantations are sometimes, and not unfrequently, found to exist at greater or less distances from the house, clothing the slopes and crowning the summits of low ranges of hills. These are often exceedingly effective, but are always found to be improved by having old quarries or chalk-pits occasionally peering out from them, and breaking their monotony. Where the chief view of these woods is obtained from the front, so that the entire face is distinctly seen, and they are not looked at obliquely, much may be done to vary and brighten them by clearing out irregular patches here and there, and sowing them down with grass; and if these breaks are made much larger in some places, and suffered to creep over the crown of the hill, they will be rendered all the more effective.

Where the front outline of such plantations is not carried quite down to the bottom of the valley, but is fringed with meadows or arable land, it will greatly improve it to throw in the fences, as before suggested, leaving scattered trees and groups along the margin, and making this as bold as possible.

After all, it may, possibly, be said that, to prescribe rules, and attempt to give practical directions on a matter of this sort, irrespective of any particular and local reference, is scarcely short of empiricism. Still, it is presumed that the characteristics described are of such common occurrence, and the mode of treatment proposed so generally applicable, that the hints thus afforded will at least serve as a foundation for carrying out the practice. Doubtless, there is much in every place which requires to be considered in itself; but the office of the improver mainly consists in adapting acknowledged rules to a particular locality.

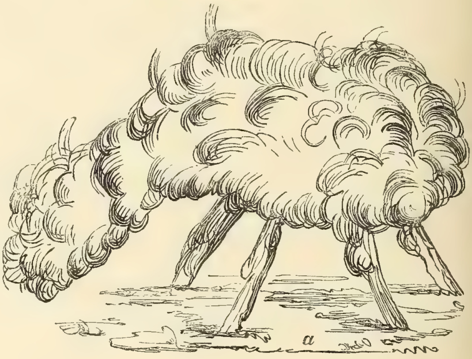
CHARACTERS, DISTRIBUTION, PROPERTIES, USES AND CULTIVATION OF FERNS.

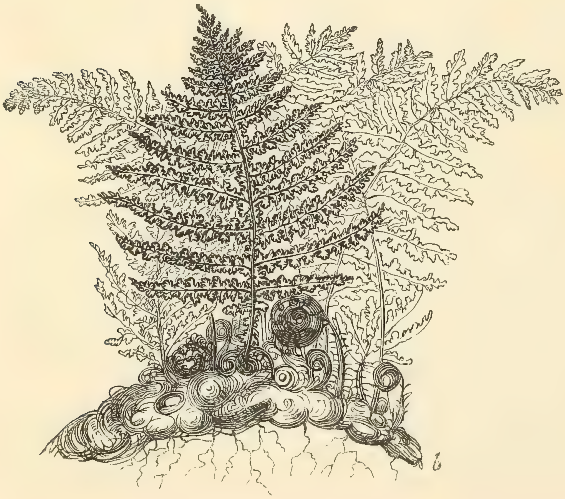
The plants called Ferns, although flowerless, are exceedingly interesting; they all form leafy plants, and produce a rhizome, or root-stock, which either creeps below the ground, spreads over the surface, or rises into the air like the stem of a Palm. The leaves are usually divided into numerous pieces, marked with forking veins, and are coiled up (or circinate) when they first unfold. The reproductive organs consist of spore cases, which are placed either upon the backs of the leaves, or on their margins, or else are wrapped up in contracted and deformed leaves.

In tropical countries, some of the arboreous kinds are said to attain to the height of forty feet, and many grow to the height of large shrubs; others become spreading herbaceous plants, and some even assume the character of climbers. Of such as possess more than an ordinary interest, may be noticed that singular species known by the name of the "Tartarian or Scythian lamb," (*Cibotium Barometz* or *Baranetz*) of our Catalogues, or, as it should be called, *C. Baranyetz*, which signifies lamb, being derived from the Russian word *Baran*, sheep. It is identical with *Cibotium glaucescens* and *Aspidium Barometz* of different authors. The plant is a native of China, whence it was introduced to this country by J. Reeves, Esq., and was afterwards received by Messrs. Loddiges, Nurserymen, Hackney.

A very strange account is given of this curious plant in "Burnett's Outlines of Botany," extracted from "Struy's Travels through Russia, Tartary," &c., published about the middle of the seventeenth century. It is as follows:—"On the western side of the Volga there is an elevated salt plain of vast extent, but wholly uncultivated and uninhabited. On this plain, which furnishes all the neighbouring countries with salt, grows the *Boranez* or *Bornitsch.* This wonderful plant has the shape and appearance of a lamb, with feet, head, and tail, distinctly formed. Its skin is covered with a very white down as soft as silk. The Tartars and Muscovites esteem it highly, and preserve it with great care in their houses. The lamb grows on a stalk about three feet high, and is capable of turning itself about, and feeding on the herbage; and should this fail the plant dries up, pines away, and dies; they are eaten by wolves, and have bones, blood, and flesh, like those of ordinary animals, hence the plant was considered a Zoophite or Plant-Animal."

This wonderful story, like many others, as Mr. Burnett very justly observes, has been found by subsequent travellers and Botanists to have been founded on very slender pretensions. The rhizome certainly spreads over the surface of the ground, and becomes of a large size,—rising to a considerable height;—it is covered with a silky fleece of a yellowish brown colour, not much unlike that of the *Davallia canariensis*, or Hare's-foot Fern;—and the sap when squeezed out violently is somewhat tinged with red, and might therefore be likened to blood; but the rhizome can scarcely be supposed to assume the rude form of a lamb (*fig. a*), without some artificial means being used; possibly, a full grown rhizome turned upside down, with the fronds cut off, having four pieces of the leaf-stalks remaining to answer for legs would represent some such appearance. We have specimens growing in the rock-work on the north-east end of the Great Conservatory at Chatsworth. They grow to a large size, and the frondose leaves are numerous, and wide-spreading. One of these plants, (*fig. b*) we measured during the autumn of 1848; and one of the fronds was more than 8 feet long, with eight branches of pinnæ, which were 5 feet in diameter at the base, tapering gradually to the extremity.

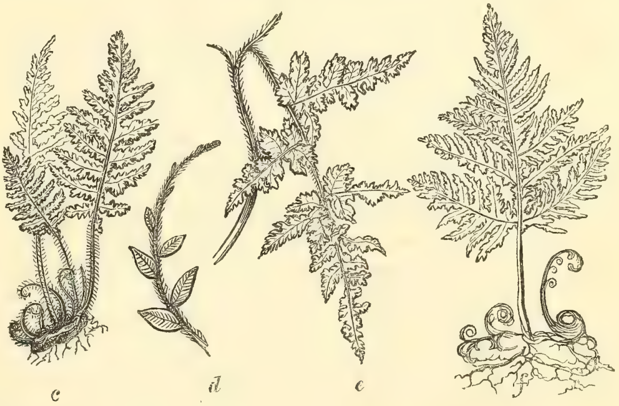




It is plain from geological observations and discoveries, that, in the earlier ages of the world, Ferns were not only far more numerous than at present, but were likewise of a more gigantic size. In a fossil state they are found in almost every one of the lower strata of our globe; they are especially numerous in the coal strata and the contiguous beds of shale; from the numbers there found in proportion to those of other species, it would almost lead to the conclusion that, at that age of the world's existence, they would constitute nearly four-fifths of its vegetation. These numbers, however, gradually diminish as we ascend to more recent strata, and they likewise diminish in size, and are found in much less perfect forms. Some of the early ones are extinct species of genera at present in existence, but others are of entirely new forms, by no means corresponding in their characters with any of the kinds at present known in a living state. All the present existing kinds, however, are comparatively diminutive, which shows it probable that in those epochs of geology, when they grew to so enormous a size, the atmosphere must have been far more humid, and the temperature much higher than even that of the tropics in the present day, for the species never luxuriate but in warm, damp, and shady situations, and cannot flourish under different conditions.

The frondose leaves, for the most part, contain an astringent mucilage, with more or less of aroma; several on this account are thought to be useful in medicine, amongst which may be named *Adiantum pedatum*, *A. Capillus Veneris*, *A. melanocaulon*, and *Cibotium Barometz*. Some are used for food—amongst these may be mentioned *Nephrodium esculentum*, the rhizomes of which are cooked and eaten in Nepal; and in other countries many others are used. In New Zealand the roots and lower parts of the stems of *Cyathea medullaris* (a tree Fern), are baked by the natives, who esteem them as nearly equal to sago. The natives of Palma, and Gomera, in the Canary Islands, employ the roots of *Pteris aquilina* (our common Brake) for food; they are first dried, then ground, and mixed with barley meal, and when boiled the mixture is called "Gofio." The roots of *Pteris esculenta* (*fig. f*) are eaten in New South Wales, the rhizomes are roasted and peeled, when they form an excellent condiment for meat; they are also said to form a good food for pigs, giving a peculiar pleasant taste to the bacon; the plant is known as the Tasmanian Fern.

The fronds of *Pteris aquilina* and *Aspidium Filix-mas* are good substitutes for hops in the manufacture of beer, containing both tannin and gallic acid. The fronds are also useful for packing apples and pears; and when burnt, the ashes contain a large proportion of alkali, which is used for making soap and glass; and the Wall-Fern, *Polypodium vulgare* (*fig. c*), is made use of for the same purpose. The *Angiopteris evecta*, one of the tree Ferns, a native of the Sandwich Islands, is employed along with *Polypodium phymatodes*, or red Polypody, in preparing and giving fragrance to the Cocoa-nut oil; and the former is also used as an article of food, which the Sandwichers call "Mehai." The tubes of the pipes of the negroes in Brazil, are made of the stalks of *Mertensia dichotoma*, which they call "Samarbaya." The leaves of *Aspidium fragrans* have a peculiar, but pleasant odour, and have been substituted for tea. The whole plant of *Aneima tomentosa* emits a fragrance resembling Myrrh; and *Mohria thurifera* smells like *Laurus Benzoin.* The large fronds of *Asplenium lucidum* are used in some of the Polynesian Islands as emblems of sorrow, and are carried in funeral processions by mourners.



Polypodium piloselloides (*fig. d*), and several others, are creepers, with slender hairy rooting stems; the first is an excellent plant for covering Orchid blocks or baskets, the leaves being small, and the stems adhering firmly by their rootlets without any difficulty.

Lygodium scandens (*fig. e*), *L. circinata*, and *L. palmata*, are true climbers, reaching four feet or more in height, and are very elegant plants.

The following remarks by Mr. Scott, superintendent of the plant department in the large Conservatory at Chatsworth, "On Raising Tropical Ferns from Spores," are submitted with a view to meet the growing interest in this generally-admired tribe of plants, as well as to aid the amateur who may feel desirous of adding new or rare species to his collection, or increasing the number of those already possessed:—

Every one who has made the attempt is aware how difficult, in many cases, it is to induce the spores of some species of Ferns to germinate. In all cases, this difficulty must arise from one of two causes. Either the spores must have been gathered immature, and, consequently, unfit for the purpose of reproduction; or, if the spores were properly matured, subsequent to sowing, the conditions necessary to insure germination were not secured. Excess of moisture will soon destroy spores in every respect fit for the purpose of the cultivator; but the condition as to moisture is so easy of control, that, from observation, I am persuaded the want of success in germinating Fern spores is chargeable not so much on any deficiency or excess in the conditions used to induce germination, as on the indiscriminate gathering, and, as a natural consequence, the immature state of the spores.

In collecting Fern spores for sowing, the first point to attend to is, always to gather them from leaves grown and matured during summer. Leaves produced in winter are often destitute of spores, or, if spores are present, they rarely can be made to germinate. The best spores will invariably be found on the best developed leaves, such leaves being of summer growth. Having selected a leaf of the sort referred to, with the fructification well matured, place a sheet of writing-paper under the leaf, strike the upper surface of the leaf gently; when a sufficient number of spore-cases have been removed, expose them, on the paper, to a moderate heat, and, by the aid of a pocket lens, examine carefully the surface of the paper, on which the spores, if present, will have the appearance of dust. Sow in pots, well drained, and in equal parts of silver-sand and finely sifted peat: the spores do not require covering, but do best sown on the surface. Water should be given with care both before and after the spores germinate. When the seedlings have formed the second leaf, move them from the seed-pot, in patches, three or four plants in each patch; plant four or five of these patches together in other pots, in which they may remain until the plants become sufficiently large to be easily separated by hand.

Many species of Ferns are readily increased by divisions of the rhizome, and some are viviparous: to such the above remarks do not strictly apply—although, even in the case of these, increasing by spores might be pursued as a subject of observation; and, as such, cannot fail being otherwise than interesting as well as instructive, especially in reference to the genus *Gymnogramma*.

The variety of forms obtained in this genus from spores would, indeed, seem to favour the idea that, even in Ferns, something very much like hybridising takes place.

So long as only one farinaceous species of *Gymnogramma* is cultivated in a collection, so long may seedlings be raised from that species, differing in no respect from the parent; but no sooner are several of the farinaceous species cultivated together, than the character of the offspring differs from that of the parent.

In the large conservatory here, an immense number of seedling Ferns spring up yearly, on the moist and shady parts of the rockwork, on which the duplicates and many of the strong-growing Ferns are planted out. The spores of *Asplenium*, *Aspidium*, *Adiantum*, *Doodia*, *Diplazium*, *Gymnogramma*, *Lomaria*, and *Pteris*, germinate freely on the perpendicular surface of stones, which have become partially covered with minute species of Confervæ and Mosses. But in no genus of Ferns, except *Gymnogramma*, in the Chatsworth collection, nor in any other collection, have I witnessed a similar disposition, on the part of the seedlings, to differ from the character of the parent. Here, then, a question naturally presents itself. Are seedling Ferns in the genus *Gymnogramma*, and of the sort just referred to, to be regarded as Hybrids, or only as differences produced by circumstances unconnected with fecundation, and unequally affecting the seedlings?

When the seedling Ferns are of a sufficient size and strength to be allowed to stand singly in pots, they should with the greatest possible care be potted, for if the roots are broken, or otherwise injured, they will be some time in recovering. The soil best suited for the purpose is a mixture of peat and leaf mould, for the plants in their natural state grow in the crevices of rocks, in shady, damp situations, where a scanty portion of vegetable mould has been deposited, or beneath dense woods, all the surface earth of which is composed of decayed leaves; and in such situations and soil only they luxuriate.

Before potting nothing perhaps is of more importance than drainage; for although fond of moisture and shade, they will not flourish if subjected in any degree to stagnant water. Place the soil about the plants with care, so as not to break the roots; screen from the sun until they have begun to grow.

The value of Ferns consists both in their intrinsic beauty, and in their applicability to specific purposes. They are singularly useful for growing in shady places where few other plants will thrive; for planting on rocks, for covering unsightly walls, for suspending in rustic baskets from the roof of a stove, for planting among trees or shrubs in large conservatories or stoves, for placing amongst Orchids deficient of foliage, and for enlivening and decorating rustic work.

Ferns are valuable for planting in shady situations; indeed, whether it be in the greenhouse or the stove, or in the open air, the majority of the species luxuriate most in shady places, where the direct beams of the sun cannot touch them. Rockeries also of all descriptions are excellently adapted for Ferns, because these plants require much less earth than most other plants, and because from the smaller number of pores in their leaves, they can live and maintain a healthy appearance for a long time, with only a small quantity of moisture about their roots. In open-air rockeries the presence of these plants creates a very natural aspect. Stove and greenhouse rockeries are greatly improved by their presence; for, as in the large rockery in the Great Conservatory at Chatsworth, the whole nearly of what would otherwise appear a cold, barren rock, is covered with a quantity of waving, plume-like, delicately green foliage, which renders it particularly attractive.

For clothing unsightly walls either in stoves, greenhouses, or shady places in the open air;—this may be done by making the surface of the wall designed to be covered, rough, and capable of holding in the interstices a small portion of soil.

They are also well adapted for planting in moss or soil in rustic baskets, and hung up in the stove or orchid house; they will even thrive on a log of wood, if fastened in a small portion of moss. Some of the smaller growing ones look well planted amongst Orchids, which plants they shade with their light and graceful foliage.

The culture of Ferns is remarkably easy, consisting merely of the following particulars:—They cannot grow and thrive without shade, exposure to sun-light soon destroys many of the more delicate species, and materially injures those of a robust and fleshy habit;—a moist atmosphere is necessary, as in their natural habitats these plants are always found in the greatest abundance in such situations; and when grown in houses this must always be kept in mind; during their growth water and syringe freely;—a moderate heat only is requisite, strong heat always injures their tender foliage;—the soil most suitable for their growth is composed of fibry peat mixed with two parts of decayed leaf mould.—They do not, when grown in pots, require very much pot-room; and if planted in rock-work, a small portion of earth only is requisite.—Drainage with potsherds of the most copious description should be given if the plants are grown in pots, because the roots will not bear any stagnation of water.

The following list contains some good kinds suitable for growing in a greenhouse or conservatory:—

Adiantum cuneatum.
„ formosum.
„ pubescens.
Allantodia australis.
„ umbrosa.
Anemia fraxinifolia.

Aspidium eburneum.
„ elongatum.
„ molle.
„ pennigerum.
„ pungens.
Asplenium flabellifolium.

Asplenium monanthemum.
„ præmorsum.
„ virens.
Blechnum australe.
„ gracile.
„ striatum.

Cibotium Barometz.
Davallia canariensis.
„ elegans.
Dicksonia antarctica.
Doodia Kunthiana.
Gymnogramma ochracea.
Lastræa elongata.
Lomaria attenuata,
„ procera.

Nephrodium Ottonis.
Nephrolepis exaltata.
Niphobolus rupestris.
Nothochlæna distans.
Platycerium alcicorne.
Polypodium aureum.
„ concinnum.
„ phymatodes.
Polystichum cæspitosum.

Pteris arguta.
„ crenata.
„ esculenta.
„ falcata.
„ longifolia.
„ serrulata.
„ tremula.
„ umbrosa.

Select list of such as require the temperature of the stove :—

Adiantum pulverulentum.
„ tenerum.
„ trapeziforme.
Aspidium exaltatum.
„ villosum.
Asplenium fragrans.
Cyathea medullaris.
„ arborea.
„ dealbata.
Dicksonia arborescens.
“ squamosa.

Diplazium auriculatum.
Gymnogramma rufa.
„ calomelanos.
„ tartarea.
„ chrysophylla.
„ sulphurea.
„ leptophylla.
„ chærophylla.
„ tomentosa.
Lomaria Fraseri.
„ longifolia.

Lygodium scandens.
„ circinatum.
Marattia elegans.
Polypodium decumanum.
„ fraxinifolium.
„ lanceolatum.
„ piloselloides.
Pteris aculeata.
„ palmata.
„ podophylla.

CULTURE OF THE SPECIES OF THE GENUS PETROPHILA.

All the species are natives of Australia; and although easy of culture, are yet scarce in collections. The best *soil* for the whole is a mixture of two parts of turfy peat and one part sandy loam. *Drain* well with plenty of broken potsherds, and mix a few pieces of freestone, about an inch square, with the soil. These, by retaining moisture, will in some degree prevent the roots from suffering, in case of occasional drought, and which from their tenderness they are very liable to. Care should also be taken that the pots, in which the plants are placed, be of a sufficient size to allow of the roots growing freely; otherwise they do not flourish.

Over-watering and drought are two extremes which these plants cannot endure; they suffer, however, less from the former than the latter. The roots are so tender that it is requisite to water at all times with care, but especially in winter. These are also two important reasons why it is not advisable to place the plants out of doors during the summer, for either the roots suffer from drought by exposure to the sun and air, or they perish from over-moisture by rain; and to these may be added a third, that they are liable to be lacerated by worms.

Propagation is effected by cuttings taken off when the wood is ripe, and planted then in shallow pots of sand. Place the pots in a moderately warm and dry atmosphere, and cover them with a handglass; water with care, and in about six weeks or two months they will have struck root. If the pots are plunged or placed in a moist strong peat, no success need be anticipated. When roots are potted off, place a handglass over them again, and allow it to remain until they have begun to grow.

The genus belongs to the Proteaceous tribe, and like other Australian plants of similar habits, they require a dry, airy situation in the greenhouse, where they can enjoy plenty of light, and will at no time be affected by fire heat, which always injures them.

MISCELLANEOUS.

New and rare Plants in Flower. *Acanthophippium bicolor.* A most noble specimen of this curious and interesting species we observed in fine bloom in the orchid house of Messrs. Rollisson, Tooting.

Æschynanthus Lobbianus. We recently observed in Messrs. Veitch's nursery at Exeter, the above species, remarkably fine in bloom. The plant was grown on a trellis attached to the wall of the stove, and the foliage was almost hidden by the large masses of flowers.

Cantua bicolor. This is a subject for our hoping that it may soon be in every collection, as it deservedly ought to be. We consider it a little gem; we saw it in flower in the nursery of Messrs. Knight and Perry, King's Road, Chelsea.

Chysis spe. nov. In the nursery of Messrs. Rollisson, Tooting, we noticed a fine new species of Chysis in bloom. The flowers were large and massy, of an ivory-like substance, with petals and sepals a fine white, tipped with a delicate tinge of yellow. The labellum is brown in the centre, with a margin of yellow. When in vigorous and healthy condition, this species will merit attention from the collectors of this interesting class of plants.

Dendrobium nobile. A handsome plant of the above we noticed in the nursery of Messrs. Knight and Perry, King's Road, Chelsea; also a plant of the

Dielytra spectabilis in flower. We shall rejoice when this plant becomes numerous, that we may have it in every garden; then may we hope to see the true character, as in its native country, forming a beautiful bush, and completely over-shadowed by the profusion of its delicate yet charming blossoms. We fear there is some difficulty in its propagation, as it has been some time now in the country. It is a species that should be possessed by every one who is a lover of flowers, and has the means wherewith to cultivate that taste.

Dendrobium moniliforme. Several handsome specimens, well-bloomed, we observed in Messrs. Rollisson's orchideous house at Tooting. This species, we presume, is rather difficult to cultivate, as it is not seen in such perfection as the other kinds, but these under notice certainly were admirably managed, possessing such an amount of blossoms: we likewise noticed several very fine Heaths, deserving great commendation for cultivation. They were—

Erica vernix ovata. The plant was upwards of three feet high and thirty inches in diameter, laden most copiously with bloom.

Erica vernix coccinea. A noble specimen, in splendid flower; the plant was thirty inches high, and twenty-four inches in diameter, covered with its handsome glossy scarlet blossoms; and

Erica Wilmoreana. A remarkably fine plant, above four feet in diameter, covered with thousands of flowers; as fine a specimen as need be seen.

Galeandra Devoniana. We recently observed in the gardens of S. Rucker, Esq., Wandsworth, a handsome specimen of the above in fine flower. The peculiar habit, form of flower, &c., renders it attractive, though wanting that great essential in flowers,—of gay colour. The gardener, Mr. Mylam, succeeds in the management of this, equally with the other species. We likewise noticed a singular variety of

Lycaste Skinnerii, of the crimson class. The flower, however, was entirely a pure white, excepting the side petals, which partook of a delicate rose tint. The above forms another link to the many varieties of this most charming Epiphyte, each one equally lovely with the rest.

Mirbelia speciosa. A beautiful specimen of the Mirbelia speciosa floribunda we lately saw flowering most abundantly in the greenhouse of Messrs. Rollisson, Tooting. The plant was about thirty inches high, and the same in diameter, completely hidden by the profusion of its blossoms.

Miltonia spe. nov. In the nursery of the above-named gentleman we saw a new species of Miltonia, having large and handsome flowers, upwards of two inches in diameter. The petals and sepals a dark rich brown, yellowish at the points. Labellum and column a pale cream-colour. This species forms another beautiful feature in this numerous and handsome race.

Oncidium pictum. In the same collection we observed a most splendid specimen of O. pictum grown on a trellis about four feet high and three feet in diameter, with upwards of fourteen flower-scapes fully developed. The general appearance gave to our mind the idea of its being one of the finest specimens in cultivation.

Phajus Wallichii. Finely in flower, the blooms unusually large. The specimen had four strong scapes upwards of five feet in height, and had a noble appearance. This plant was likewise in the orchideous house of Messrs. Rollisson, as also a plant of

Maxillaria Harrissonia. Upwards of three feet in diameter; most splendidly flowered.

Rhododendron arboreum hybridum. A noble specimen, holding upwards of three hundred heads of bloom of a most dazzling scarlet colour. The plant is a spreading one, about ten feet in height, and is one of the finest plants we have had the pleasure of noticing. We saw it in the garden of S. Rucker, Esq., Wandsworth, where we observed a fine

Schomburghii violacea. This species has a scape near five feet in length, crowned by a large truss of dark violet-coloured flowers: the sepals and petals much crisped. It has a very handsome appearance when in fine condition, as in the above specimen.

Vriesa splendens. In the spring of 1848, we noticed this species in the nursery of Messrs. Rollisson, Tooting, and as far as the flower was concerned, the plant was worthless; but as an ornamental plant it possesses a considerable amount of beauty. It belongs to the same class as Tillandsia, and requires the same treatment: the foliage is a delicate green, richly barred across with chocolate colour, about an inch apart, from the base to the point of the leaf. The flower-scape is about eighteen inches long, round at the base, and gradually assuming a flat appearance; it is green for three or four inches, barred with chocolate as the leaves; it then becomes a rich scarlet, forming the flat bracts out of which the simple flowers are produced, of a yellowish white colour. We have since seen it several times in bloom, and recently in the nursery of Messrs. Henderson, Pineapple-Place, Edgware Road. We are informed that there is another variety, possessing great beauty in the flower as well as in habit: we shall take the earliest opportunity of noticing it when in bloom.

Renanthera coccinea. *Chinese Air Plant.* For a successive production of flowers, this fine scarlet-flowering Orchid can scarcely be surpassed; with the exception of a short period of torpidity in mid-winter, it is rarely deficient of bloom. In the large Conservatory at Chatsworth, it grows attached to a large block of wood, inserted in the border on the west side of the house, where it is exposed to a considerable portion of sun-light during the after part of the day. The roots are not covered with moss, but grow vigorously upon the naked wood without any shelter. Whilst the shoots are in a state of vigorous growth, the leaves assume a rich vivid green; but as the shoots become ripened, and the plant approaches a condition for flowering, the whole acquires a yellow tint; and shortly afterwards the panicles of flowers make their appearance. Perhaps no Orchid requires less care or attention than this; and few surpass it in beauty. The temperature requisite for its growth should be moderate, the humidity not greater than that given to Cattleyas. Ordinary shade is quite sufficient, and even that afforded by other plants will in most cases be all that is required,—moss and soil are unnecessary; a block of wood suspended from the roof, or placed in a large pot or in the ground, and the plant firmly attached by fine wire until its roots have fixed themselves,—syringing with tepid water when growing, and complete drought when at rest, may be considered all this plant's requisites. It is a native of China and Cochin-China, where it grows abundantly on trees.

Vegetation at Paras-Nath, in Sikkim-Himalayah. There are a good many tanks at the base of the hills here; their existence so near a lofty mountain, from whose sides water-courses innumerable descend, indicates the great natural dryness of the country during one season of the year. Two species of *Clusia* abound, with a *Potamogeton,* and *Utricularia,* besides *Mazus, Lindenbergia,* and a few dwarf *Leguminosæ* on the banks. The hills and the valleys though rich, are far from luxuriant. A fine *Nauclea* (cordifolia) is a common tree; a small *Bignonia,* and a handsome *Combretum,* with white and red floral leaves, abound; also *Conocarpus latifolius,* and a large-leaved *Smilax* and *Dioscorea.* The *Ferns* consist of *Lygodium, Cheilanthes* (silvery underneath), *Adiantum* and *Selaginella,* with abundance of *Marsilea* and *Azolla* in wet places. Bamboo is a prevalent plant, probably *B. Stricta. Acanthaceæ* are the prevalent Natural Order; they consist of gay flowered *Ruellias, Barlerias,* and such like, sometimes large shrubs; *Bauhinia* (scandens or racemosa) is very frequent, and an erect smaller species. Other plants very typical of the flora of this dry region are Linum trigynum, Feronia elephantum, Ægle Marmelos, Helicteres Asoca, Abrus precatorius, Flemingia, various Desmodia, Rhynchosiæ, Glycine, and Grislea tomentosa, very abundant. Conocarpus latifolius, Loranthus longiflorus, and another species; Exacum tetragonum, Erythræa centaurioides, Canscora pusilla, Phyllanthus Emblica, various Convolvuli, Argyreia, Ipomæa and Evolvulus, Cuscuta, and several herbaceous Compositæ, as Sphæranthus, Emilia, Conyza, Wollastonia, Vicoa Indica, Blainvillea, &c.—*Dr. Hooker's Botanical Mission to India, Jour. Bot.,* 4.

Astrapæa Wallichii. This beautiful plant is now too well known in our stoves to require any description. It is a native of Madagascar, and planted out in the border of the large Conservatory at Chatsworth, it forms a noble plant; its fine large cordate leaves and long hairy petioles, with the broad stipules at their base, all of a pale green, render it at all seasons a striking object. The habit is to grow very rapidly and strong; it therefore requires plenty of room for its roots, and the soil should be of rather a strong texture, and be pretty rich. For some time past the flowers have been successively produced at Chatsworth, and have a splendid effect, being pendulous, of a bright scarlet, and being clustered together into large bunches. The plant is of the easiest growth, requiring a rich soil, plenty of root-room, a good supply of water both at the roots and overhead whilst in a state of growth, a damp stove atmosphere, partial drought when in a state of rest, and keeping free from insects and dirt.

The Alpine or Boursault Roses are very distinct from all others. The shoots are long, flexible, very smooth, in some instances entirely free from thorns; the one side often of a pale green, the other of a reddish tinge; the eyes are formed further apart than common. The flowers are produced in large clusters. By these features the varieties of this group are readily distinguished. The Boursault Roses, though of vigorous growth, are not of a sufficiently pendulous habit to make perfect "Weeping Roses" without assistance from the cultivator. When desired to be formed into such, the branches should be drawn to the ground with tar-twine, or twisted bast, when the immense trusses of flowers they bring forth give to the tree an appearance truly gorgeous. One inducement to grow them in this manner is, that most roses of a pendulous growth produce pale-coloured flowers, and these introduce a charming variety among Weeping Roses; for the Boursault are mostly purple or crimson. Besides forming good Weeping Roses, they are fine grown either on pillars or on fences, with a northerly aspect; a situation where few other kinds succeed well. They are very hardy, and will bloom well in situations where they scarcely obtain a gleam of sunshine. Boursault Roses should be well thinned out in pruning; but the shoots that are left for flowering should be shortened-in very little.

The Scotch Roses all form compact bushes, and are usually grown as such, for they are not well adapted for standards. They flower abundantly and early in the season. The flowers are small and globular; many of them, as they hang on the bush, looking like little balls. They are in character planted as a hedge round a Rosarium, when such may be required; a bank of Scotch Roses also produces a good effect. When the plants become established in the soil, the stems push laterally under ground, often rising to the surface at a considerable distance from the plant. There are some hybrids in this group well worthy of cultivation; the Perpetual Scotch and Stanwell, which bloom both in summer and autumn, are the most remarkable.

THE MINIATURE PROVENCE, OR POMPON ROSES. The roses in this group are remarkable for their diminutiveness. They are well adapted for edgings to the Rosarium, or Rose-clumps generally. They are sometimes planted in masses, in which manner they look well, as they are of neat growth and bloom profusely; but they do not last long in flower. Of the varieties of Pompon Roses, those most generally in cultivation are "Dwarf Burgundy," "De Meaux," "Spong," and "White Burgundy."—*Paul's Rose Garden.*

STERCULIA VILLOSA. The fibre of this plant is called Oadal. The genus *Sterculia* belongs to a family (*Sterculiaceæ*) which abounds in tenacious fibre. This, however, is never manufactured into cloth; its use in India is confined to ropes, which, when well prepared, are equal in strength to the best "Coir." The tree is very common in Eastern India, and the ropes are readily made; for the bark, or rather all the layers, can be stripped off from the bottom to the top of the tree with the greatest facility, and fine pliable ropes may be obtained from the inner layers of the bark, whilst the outer yields coarse ropes. The ropes are very strong and lasting, and are little injured by wet. They are used by all the elephant-hunters in the jungles.—*Hook. Jour. Bot.*, 27.

STERCULIA GUTTATA. The bark of this tree the Malabars convert into a flaxy substance, of which the natives of the lower coasts of Wynaad continue to make a sort of clothing. The tree is felled, the branches lopped off, and the trunk cut into pieces of six feet long, a perpendicular incision being made in each piece; the bark is opened and taken off whole, chopped, washed, and dried in the sun. By these means, and without any further process, it becomes fit for the purposes of clothing.—*Hook. Jour. Bot.*, 27.

BÖEHMERIA NIVEA, OR CHINESE GRASS CLOTH PLANT. A very beautiful fabric is manufactured from the fibre of this plant, first imported here in the form of handkerchiefs, and more lately to a considerable extent, as superior to any other kind of fabric for shirts. The genus belongs to the Urticaceous (Nettle) family.

BÖEHMERIA PUYA. The fibre of this species has been long and extensively used in India for various purposes, and when properly dressed, is said to be quite equal to the best European flax, while it makes better sail-cloth than any other vegetable fibre produced in India. Rope formed of it has been tested in the arsenal and government dockyards, and found perfectly equal to any and all purposes for which cordage made of Russian hemp has hitherto been employed.—*Hook. Jour. Bot.*, 26.

PUCHA-PAT, OR PATCHOULY. The history of this favourite oriental scent, the use of which, in a fluid form, has now extended to Europe, being sold in the perfumers' shops. The plant producing it has been described by Professor Tenore under the name of *Pogostemon suavis*, and by M. Santelet under the name of *P. Patchouly*, which latter is adopted by Mr. Bentham in the *Labiatæ* of the 12th volume of De Candolle's Prodromus. It is said to grow wild at Penang, and on the opposite shore of the Malay peninsula, in Wellesley province. The Arabs use and export it more than any other nation. Their annual pilgrimship takes up an immense quantity of the leaves. They employ it principally for stuffing mattresses and pillows, and assert that it is very efficacious in preventing contagion and prolonging life. It requires no preparation, being simply gathered and dried in the sun.—*Hook. Jour. Bot.*, 23.

COQUILLA NUT (*Attalea funifera*). Few have walked the streets of London without remarking that of late years those streets are, in places at least, kept peculiarly neat and clean by the stiff fibres of a new material for making brushes and brooms; those of the machines, as well as those employed by hand. These are not made of whalebone, as is generally supposed, but of the coarse fibre of a species of Palm (*Attalea funifera*) which grows abundantly in Brazil, and is imported to Europe extensively from Para, tied up in bundles of several feet in length, and sold at the price of 14*l*, the ton, under the native name of *Piaçaba.* The fruit, or nuts, are another article of commerce, long brought into England under the name of Coquilla Nuts, and extensively used for various kinds of turnery-work, especially in making the handles of bell-pulls, umbrellas, &c.; for the shell (or putamen) is of great thickness, excessively hard, beautifully mottled with dark and light brown, and capable of taking a high polish. Healthy young plants of this Palm are in the Royal Gardens at Kew, although it is rarely met with in private collections. The genus belongs to the Cocoa-nut group, and the plant was first called by Gærtner *Cocos lapidea*, afterwards by Targioni Tozzetti, *Lithocarpus cociformis*, having reference in both cases to the very hard, almost stony nature of the fruit. The stem is said to attain a height of from twenty to thirty feet, and the leaves or fronds rise to fifteen or twenty feet above that.—*Hook. Jour. Bot.*, 121.

MANNA. Of the Manna so called, of Scripture, we know nothing further than what we learn from the Sacred Book. The Manna known in medicine is a sweet concrete exudation, procured from a tree called by Linnæus *Fraxinus Ornus*, or the Flowering Ash (perhaps the *Fraxinus rotundifolia* of Lamarck), and a native of the south of Europe and Asia Minor; but the Manna seems chiefly to be collected in Calabria and Sicily. In the districts of Capace, Cinesi, and Fabarotto, where the best Manna is obtained, the tree does not form woods, as is commonly supposed, but is cultivated in separate plantations. These plantations generally present regular squares, hedged in with *Cactus Opuntia.* The trees are planted in rows, and are from two to eight inches in diameter, with stems from ten to twenty feet high, which from the first shoot are kept smooth and clean. The soil is carefully loosened and freed from weeds. After the eighth year the trees yield Manna, which they continue to do from ten to twelve years, when they are cut down, and young shoots from the roots trained; one root-stalk frequently yields from six to eight new trees and more. For the production of the Manna, young and strong shoots are requisite; but they are not tapped till the tree ceases to push forth any more leaves, and the sap consequently collects in the stem. This period is recognised by the cultivators from the appearance of the leaves; sometimes it occurs earlier than at others, and the collection of Manna takes place either at the beginning of July or early in August. Close to the soil cross sections are made in the stem, and in the lowermost sections small leaves are inserted, which conduct the sap into a receptacle formed by a Cactus leaf: this is the way the Manna is obtained. The incisions are repeated daily in dry weather, and the longer it continues the more Manna is obtained. The stems are left uninjured on one side, so that the Manna runs down the smooth bark more easily. The next year the uninjured side is cut. After the Manna has been removed from the trees, it has further to be dried upon shelves before being packed in cases.—*Hook. Jour. Bot.,* 124.

DOREMA AMMONIACUM, OR GUM AMMONIAC PLANT. The Ooshak, or Gum Ammoniac Plant, grows in great abundance over the arid plains in the vicinity of the town of Jezud Khāst, on the borders of the provinces of Fars and Irak, a district appertaining to the government of Ispahan. The plant is perennial, and throws up from the roots a cluster of leaves, and one or more strong vigorous naked stems, of three or four feet in height, divided into joints of five or six inches long, throwing out various branches of equal length. The white juice which forms the gum pervades the whole plant, but exudes chiefly from the principal stems.—Major Willock in *Lin. Trans.* v. xvi., 606.

HABROTHAMNUS FASCICULATUS AND CORYMBOSUS. These beautiful plants (the first of which we figured in our *Magazine of Botany,* v. xv., p. 193) certainly bear out fully the character we have given of them. In the winter garden of the Royal Botanical Society, Regent's Park, we recently observed them in fine perfection, forming large bushes, literally covered with their gay-looking flowers.

NEW AND BEAUTIFUL PLANTS FIGURED IN THE BOTANICAL PERIODICALS.

Bejaria coarctata. *Close-flowered Bejaria.* This species is from the collection of Messrs. Lucombe, Pince and Co., in whose Exeter Nursery it flowered in a cool greenhouse in January last with no more care than is devoted to Indian Azaleas. Indeed, seeing that it is a native of very cold situations in Peru, according to Humboldt, at an elevation of from 9,000 to 10,000 feet, it seems more than probable it will bear the open border with us. It thrives and flowers well, placed close to the glass in a cool airy greenhouse potted in a mixture of sandy peat soil, and a small portion of half-decayed leaf-mould. It is increased by cuttings and seeds.—*Bot. Mag.*, 4433.

Dendrobium Devonianum. *The Duke of Devonshire's Dendrobe.* Assuredly one of the most delicate and lovely of all Orchids. It is a native of the Khoseea hills in the East Indies, where it was discovered by Mr. Gibson, and was sent, with many other excellent things, to Chatsworth in 1837. It was figured in our *Magazine of Botany*, v. vii. t. 169. The charm of this plant is wholly confined to its flowers,—the stems and foliage possess no attractions. Except in the colour and markings and frutescence, the flowers have a considerable resemblance to those of *D. fimbriatum.* It requires to be kept in a warm house, and should be suspended from the roof either attached to a block of wood, or in an open basket containing loose turfy peat, mixed with chopped sphagnum. The flowers are produced on the leafless stems during the dry season. It increases by lateral shoots which emit roots, and continue to grow while attached to the old stems.—*Bot. Mag.*, 4429.

Curcuma cordata. *Heart-leaved Curcuma.* One of the most beautiful of a singularly handsome group of plants, too much neglected in our stoves; where, whether in flower or only in leaf, they add greatly to the ornament of the house. It was discovered by Dr. Wallich in thick bamboo forests, on the hills opposite Prome, who sent plants of it to Kew and Sion House. It flowered at Sion House in July 1847. A herbaceous plant, requiring to be grown in a tropical house, with a fair supply of moisture during the period of growth, but to be kept perfectly dry during the season of rest.—*Bot. Mag.*, 4435.

Eriopsis rutidobulbon. *Rough-stalked Eriopsis.* A species from New Grenada, whence it was introduced through Mr. Purdie to the Royal Gardens of Kew, where it flowered in August, 1848. The flowers are of a dull orange-yellow, coloured with red around the margin of each. It was discovered growing on the smooth stem of a Palm-tree, fully exposed to the sun, in the temperate region of Antigua, at an elevation of between 4,000 and 5,000 feet, the thermometer falling in the morning to 65°, and rising during the day to 75°, which, on account of the less weight and consequent variety of the atmosphere at that elevation, may be considered as equivalent to a temperature of 55° and 65° with us. It requires a cool part of the Orchid-house. —*Bot. Mag.*, 4437. This is in no respect different from *E. biloba*, except in having been better cultivated than the specimen from which the plant was first described.

Eriostemon intermedium. *Intermediate Eriostemon.* This handsome shrub is worthy of cultivating in every greenhouse, loaded as the shrub is with its lively blossoms (white, tinged with pink in bud), during the latter winter and early spring months, when such plants are peculiarly welcome. It grows in a turfy peat soil, and requires the temperature of the greenhouse.—*Bot. Mag.*, 4439.

Gesnera picta. *Painted Gesneria.* This is a native of Columbia, and was sent to the Royal Gardens by Mr. Seemann. It is exceedingly beautiful, not only in the rich colour of the flowers, which are of a bright scarlet and yellow, but also in the fine velvety texture of the upper side of the leaves, and the rich colour of the underside. It requires the heat of the stove; is of a robust habit, and continues a long time in flower.—*Bot. Mag.*, 4431.

Gloxinia Fimbriata. *Fringed Gloxinia.* A very pretty and delicate-looking stove plant, which was received at the Kew Gardens from M. Ketelew, of Paris. It appears very different from any other Gloxinia with which we are acquainted, and is a valuable addition to the stove. It is an herbaceous plant, the stem dying to the ground after having flowered and perfected its singular roots. Its treatment is the same as for other Gloxinias.—*Bot. Mag.*, 4430.

Maxillaria leptosepala. *Narrow-sepaled Maxillaria.* From New Grenada, whence it was sent by Mr. Purdie in 1846. It bore its large and really handsome white flowers in the stove of the Royal Gardens in January 1849. It should be kept in a cool part of the stove, and thrives attached to a block of wood.—*Bot. Mag.*, 4434.

Pachystigma pteleoides. *Ptelea-leaved Pachystigma.* A native of the mountains of Santa Cruz, Jamaica, where it was discovered by Mr. Purdie in 1844. It produced its cream-coloured fragrant flowers in the stove of the Royal Gardens in February 1849. It forms a small tree, and will grow in any kind of good garden-soil.—*Bot. Mag.*, 4436.

Stifftia chrysantha. *Golden-flowered Stifftia.* This beautiful shrub has been long an inhabitant of our stoves, but until the present year it has never flowered. The flowers are of a rich orange and very showy. The plant is a native of Brazil, and was originally introduced to Kew.—*Bot. Mag.*, 4438.

Vanda tricolor. *Three-coloured Vanda.* One of the many very fine plants recently introduced by Messrs. Veitch and Son, from Java, through Mr. Thomas Lobb. It is one of the most beautiful of this eminently beautiful genus, and requires a warm temperature, and to be fixed to a block of wood.—*Bot. Mag.*, 4432.

CALENDAR OF OPERATIONS FOR MAY.

The weather will now begin to be warm and settled; use caution, however, in removing the covering from tender plants, or fruit-trees against walls, too soon; it is better to keep the coverings open, but so that they can be let down in case of frost. Any time after the middle of the month, preparation may be made for planting out the half-hardy plants in the flower-garden; but for all the northern parts of England, this business would be better delayed until nearer the end. See that the colours are so arranged as to produce a pleasant harmony.

FRUIT AND VEGETABLE DEPARTMENT.

Glass.

Cherry Trees which have ripened their fruit should be placed out of doors as soon as the wood is sufficiently matured. If the fruit on those remaining are beginning to ripen, keep the house dry and moderately warm, but give abundance of air early every fine morning.

Fig Trees ripening their fruit, must not be subjected to syringing; a moist atmosphere, however, should be supplied, or they will be injured by red spider.

Cucumbers and Melons in full growth, must be regularly attended to with water and air. New plants may also be started for later crops. Cucumbers may, at the end, be planted in ridges, but must for the present be covered with hand-glasses. Good bottom-heat, plenty of water, freedom from insects, and judicious pruning, will effect all that can be wished with these fruits.

Peach Trees now ripening their fruit, should have netting neatly tied to the wires, and made to bag in many places so as to prevent the fruit falling together, and becoming bruised as they separate from the tree. Dust with sulphur, if either mildew or red spider make their appearance, and fumigate with tobacco or tobacco-paper, if the Aphis should become prevalent. Give air early in the morning, and do not allow the atmosphere to become too dry.

Pines swelling their fruit, should be attended to with water and heat; once or twice a week, a little weak liquid manure may be supplied. Where successions are grown in pots, potting may now be performed, and the plants replaced in heat, with a very moist atmosphere.

Vines must still be attended to by stopping, tying in, and thinning the fruit. Give a moderately moist atmosphere, and plenty of air.

Open Air.

Apricot Trees should be looked over again, and the insects dislodged from their hiding places in the buds; also the sooner these trees are disbudded, the better.

Apple Trees have generally their fruit injured by a small white caterpillar during this month; it is the larvæ of a small grey moth, usually known by the name of the "codlin moth." In about a month after the eggs are laid, the small caterpillar becomes full grown, and eats its way out of the fruit, it then forms a cocoon in the chinks of the bark of the trees, and in about eight days the perfect moth emerges; a second crop of eggs is laid, and the damage is thus increased. The only way to keep these depredators down, is to pluck off all the small infected apples as soon as they are seen, and before the grub is full grown; if these be carefully destroyed, the second generation of moths will be much less numerous, and their injuries in consequence, lessened.

Currant Trees against walls, are often about the end of the month, attacked by a beautiful little clear-winged moth, called the Currant Tree Sphinx; the larvæ feed upon the pith of the stem and branches, and are the cause of the sudden dying of large branches without any apparent cause. The only remedy for this, is to cut off and burn the infested branches as soon as the damage is perceived and before the larvæ become full grown, otherwise there is danger of their making their escape.

Disbud wall trees of all kinds. When the fruit is firmly set, use the engine freely, and when the frosts are fairly over, remove the nets and other covering.

Cabbages and Cauliflowers hoe and earth up; and about the 18th or 20th, sow a bed of the latter for use in the autumn.

Herbs, as Sweet Basil, &c., may now be safely planted out.

Kidney Beans, both dwarfs and runners, may be sown after the middle.

Sow a succession of beans, peas, radishes, small salad, lettuce and spinach, about every fortnight; also a few endive may be put in towards the end.

Turnips. Sow early Dutch about the middle, and some early stone, to succeed them towards the end.

FLOWER DEPARTMENT.

Glass.

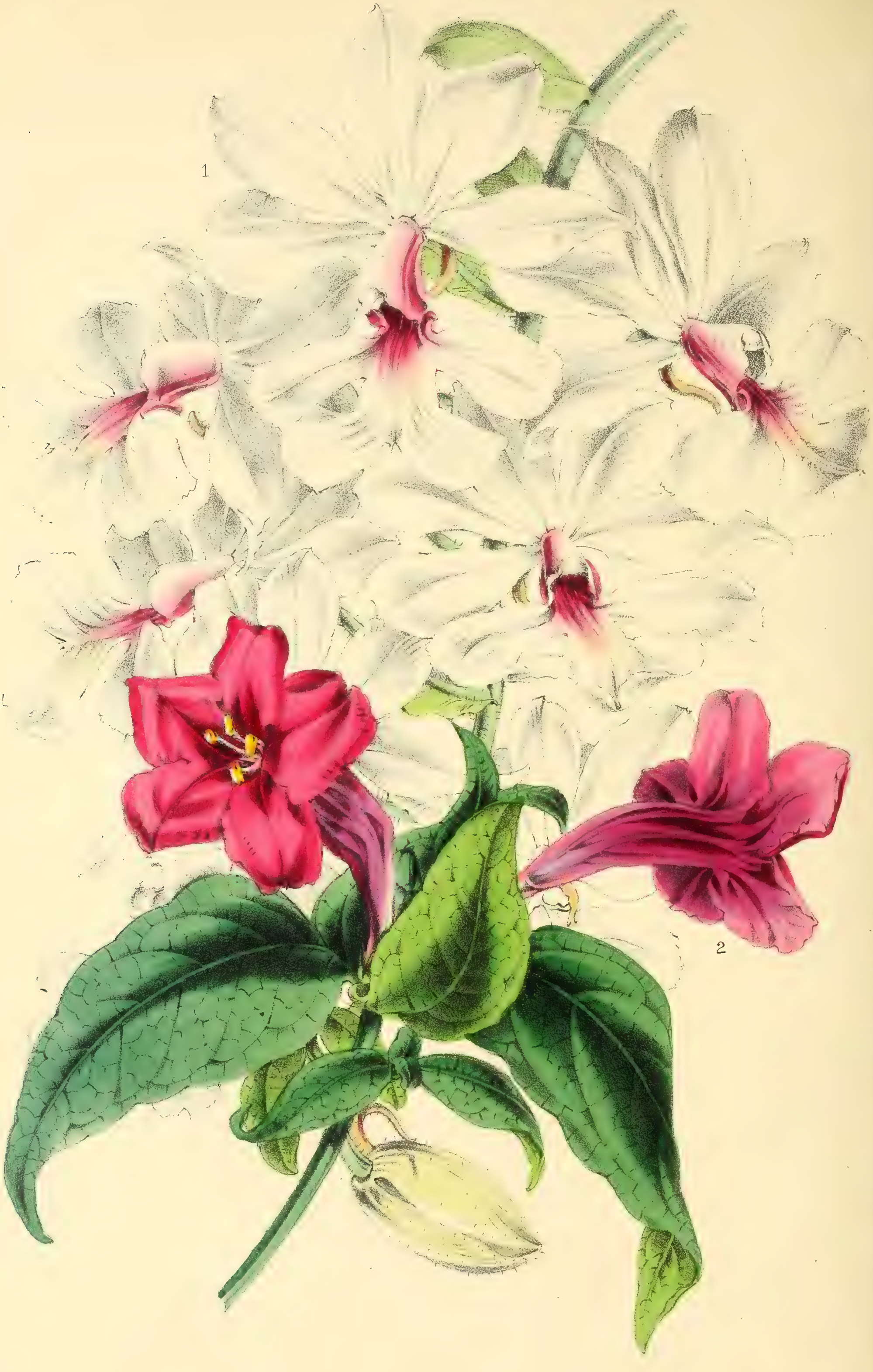
Conservatory and Greenhouse. Give abundance of air, and keep the plants well supplied with water. Stop the growing shoots of Ericas, Epacrises, and other similar plants, to render them bushy.

Orchids not requiring to be fully potted, are benefited by adding a little new material to the old in which they grew last season. A humid atmosphere, a good heat, plenty of water, and effectual shade, are of great importance now.

FOREST DEPARTMENT.

Nursery. Finish planting Evergreens as early as possible, if the weather at all prove dry. Water and mulch all newly-planted ones.

Forests and Coppices. Thin Oak and Larch. When bark is an object, as soon as the bark will run, proceed with this work with as little delay as possible, and select airy situations for drying it. When ready, have it carted off without delay.



S.Holden, del & Lith.

1 Calanthe vestita.
2. Ruellia Purdieana.

PAXTON'S

MAGAZINE OF GARDENING AND BOTANY.

CALANTHE VESTITA. (Clothed Calanthe.)

Class, GYNANDRIA.——*Order*, MONANDRIA.——*Nat. Order*, ORCHIDACEÆ.——(Orchids, *Veg. King.*)

GENERIC CHARACTER.—*Labellum* spreading, spurred, cut into three or four lobes, united with the column, base dentate, bearded. *Sepals* spreading. *Anthers* terminal. *Operculum* deciduous. *Pollen Masses* eight, waxy.

SPECIFIC CHARACTER.—*Leaves* radical, 18 inches or more high, of a rich green, plaited, nerved, lanceolate, channelled, tapering towards the base. *Scapes* several, 3 feet high, simple, upright, round, covered with numerous white hairs; *sheaths* small, lanceolate, close-pressed. *Flower-spikes* terminal, upright, extending to a foot in length; *bracts* small. *Flowers* villous on the outside, large, pure white, stained in the centre with crimson. *Sepals* reflexed, nearly equal, two inner segments rather narrowest. *Labellum* much longer than the sepals, continuous with the lower side of the apex of the column, forming an apparent appendage to it, three-parted, two side segments rounded, middle one bifid, the whole pure white, with deep crimson at the base. *Column* short, thick.

AUTHORITIES AND SYNONYMES.—Amblyglottis, *Blume*. Alismorchis, *Thouars*. Centrosia, *Achille Richard*. Limodorum, *Willd*. Calanthe, *Brown*. Calanthe vestita, *Lindley, in Hort. Jour., and of the Nurseries.*

A FINE terrestrial Orchid, introduced by Messrs. Veitch and Son, of Exeter, through their collector, Mr. Lobb, who discovered it at Moulmein, and forwarded it with many other valuables about two years ago.

A more delicately beautiful species of Calanthe could perhaps be scarcely conceived; the flower spike is slender, and well clothed with large flowers of the most delicate white; the centre is stained with deep and rich crimson, which renders the plant when in bloom extremely interesting.

The specimen from which our drawing was made bloomed in profusion in November, 1848, in the stove of Messrs. Veitch, who exhibited it at the Horticultural Rooms, Regent Street, when the large silver medal was awarded for its merits. It is without doubt by far the handsomest species of Calanthe hitherto discovered.

The plant is of easy culture, growing freely in a mixture of light turfy loam and peat, with the addition of a small portion of leaf-mould. A light airy part of the orchid house is the best for them, as otherwise the flowers do not expand freely: care must also be taken not to saturate them with water at the roots but give only a moderate supply, except when the plants are in the most vigorous growth. In times of torpidity, keep cool and dry. Propagate by division of the root.

The generic name is derived from *kalos* beautiful, and *anthos* a flower.

RUELLIA PURDIEANA. (Mr. Purdie's Ruellia.)

Class, Didynamia.——*Order*, Angiospermia.——*Nat. Order*, Acanthaceæ.——(Acanthads, *Veg. King.*)

Generic Character.—*Calyx* five-parted; *lobes* equal or sub-equal. *Corolla* hypogynous, funnel-shaped, *limb* five-parted; *lobes* equal, spreading, obtuse. *Stamens* four, inserted in the tube of the corolla, didynamous. *Anthers* oblong, two-celled; *cells* parallel, equal. *Ovary* two-celled. *Style* simple. *Stigma* oval-shaped, channelled at the back. *Capsule* oblong, quadrangular, two-celled, six to eight-seeded; *cells* two-valved; *valves* seed-bearing. *Seeds* adhering by a thread.

Specific Character.—*Plant* a perennial shrub, growing from one to two feet high. *Stems* erect, smooth. *Branches* obtusely angular, almost round, of a yellow green. *Leaves* opposite, ovate-acuminate, penninerved, entire, smooth. *Flowers* axillary and terminal, produced only in pairs, one from each axil, and generally near the extremity of the shoots. *Bracts* two at the base of each flower, large, leaf-like. *Calyx* small; *segments* subulate, erect. *Corolla* of a deep rose colour; *tube* long, curved, widening upwards; *limb* spreading, sub-equal, waved. *Anthers* sagittate, white. *Ovary* oblong. *Style* the length of the tube. *Stigma* cleft; *segments* unequal.

Authorities and Synonymes.—Ruellia, *Linn.* Ruellia Purdieana, *Hooker in Bot. Mag.* t. 4298.

This species of Ruellia forms an excellent stove plant, flowering more or less throughout three parts of the year. The flowers are of a rich rose colour, approaching to crimson, they are not however produced abundantly, seldom more than one or two pairs being borne near the extremity of each shoot; in this respect it is by no means equal to *Ruellia macrophylla*, figured in our "Magazine of Botany," vol. xiv, t. 29. The foliage, however, is handsome, and the rich green contrasts well with the bright colour of the flowers.

Our drawing was made in October, 1847, from a specimen which bloomed in the nursery of Messrs. Rollisson, of Tooting.

It succeeds with the same treatment as other Ruellias, potted in light rich soil, and cuttings strike freely planted in the same kind of soil, and placed under a glass in heat.

The generic name is given in honour of John Ruelle, of Soissons, botanist and physician to Francis the First.

ALSTRŒMERIAS.

1. Rubella. 2. Labiata. 3. Albens. 4. Marginata. 5. Pulchella rubra.

Class, Hexandria.——*Order*, Monogynia.——*Nat. Order*, Amaryllidaceæ.——(Amaryllids, *Veg. King.*)

Generic Character.—*Sepals* six, the two lower ones half tubular at the base. *Stamens* unequal, and generally bending downwards. *Stigmas* three. *Capsule* roundish-oval, six-angled, three-valved and many-seeded.

GARDEN VARIETIES.

1. Rubella. *Flowers* large, showy. *Sepals* six, lower ones pale rose, wedge-shaped; two upper ones broader, orange-yellow, bordered with rose colour, and striped with red.

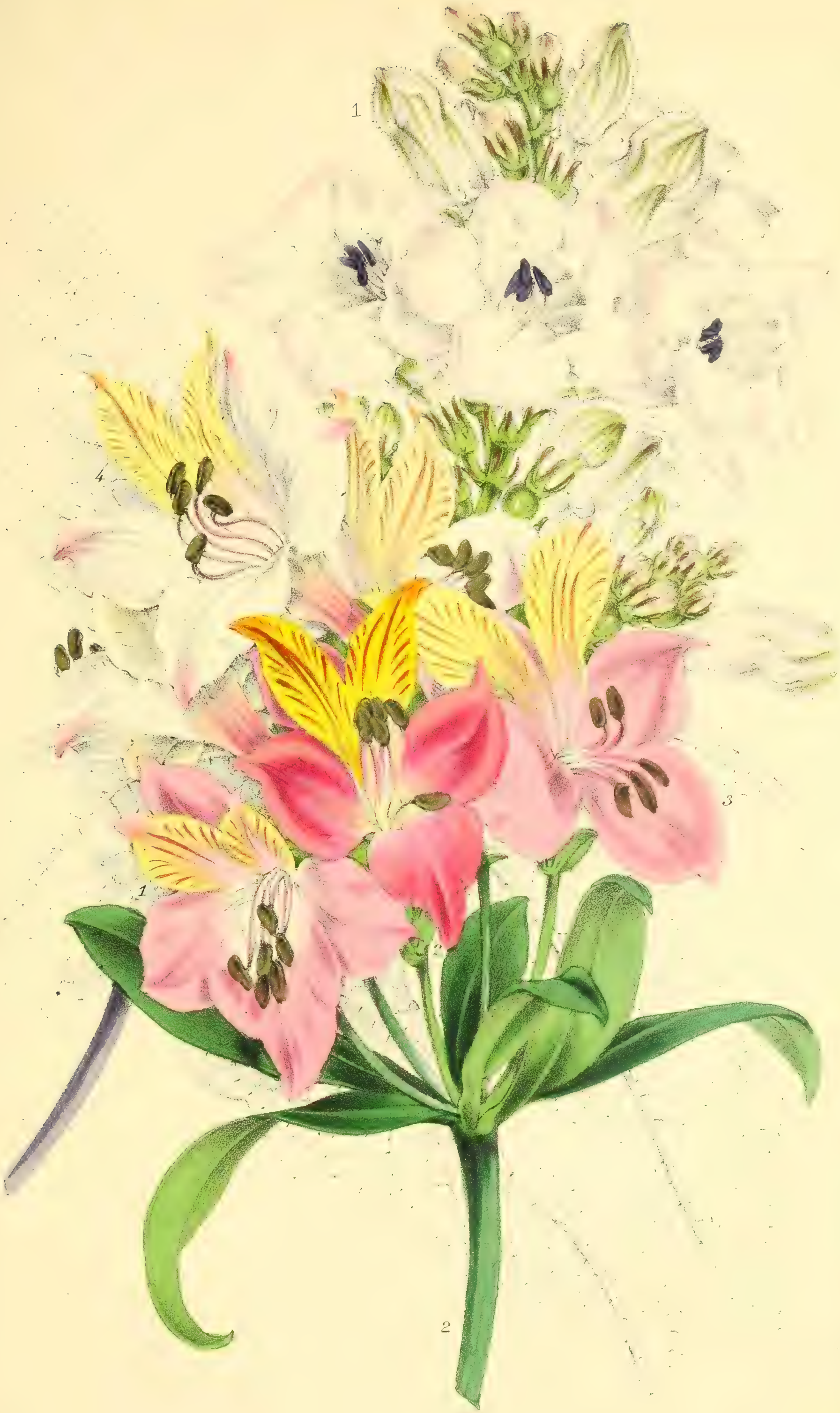
2. Labiata. Lower *Sepals* of a deep rose colour, upper ones deep orange, striped with dark red.

3. Albens. Lower *Sepals* white, tipped with pale rose colour; two upper ones dull yellow, tinged and striped with deep rose.

4. Marginata. Lower *Sepals* white, margined with rose; upper ones pale yellow, striped with red.

5. Pulchella rubra. Lower *Sepals* pale rose, upper ones orange-yellow, striped with red, similar to those of Rubella; but the flowers are larger, and when the two plants are seen together, they are very distinct.

Our drawing of these fine hybrid Alstrœmerias was made in July, 1848, from specimens sent from the nursery of Messrs. Backhouse and Sons, York. They are all very showy, and for all lovers of these kinds of plants they well deserve cultivation. Like other Alstrœmerias they thrive in a mixture of equal parts rich turfy loam, peat, and sand.



S. Holden, del & Lith.

1. *Henfreya scandens*

2. *Alstræmerias. var*

1. *rubella* 2. *labiata.* 3. *pulchella. rosea* 4. *albens.*

"The best way to treat all the kinds is to plant them in a light rich soil in a border within a glazed pit, which is just heated sufficient to keep out frost in winter. Here they will grow with great vigour, throwing up strong suckers in all directions, and flowering beautifully: their leaves will not, on the one hand, be parched by the drying cold winds of April, nor on the other, scorched by the sun at Midsummer. Thus protected, they will perform all their natural functions as if in their native soil; and an abundance of food will be sent down into the roots, which will be thus prepared, upon the return of the growing season, to send up new shoots with the greatest vigour."—*Mag. Bot.* v., t. 199.

Many of the kinds may be considered quite hardy, and will endure several degrees of frost: but when planted in the open borders it is always best to select warm situations, and during the winter season to cover the crowns of the plants when the tops have died down, with leaves or long litter, to keep out the frost.

Propagation is effected by seeds, which always do best when sown immediately after they ripen, and the young plants should be kept in a growing state until they have perfected their first year's development, and the stems die down naturally; then keep them dry until the growth again commences.

The generic name is given in honour of Baron Claudius Alströmer, a Swedish botanist.

HENFREYA SCANDENS. (Climbing Henfreya.)

Class, Didynamia.——*Order*, Angiospermia.——*Nat. Order*, Acanthaceæ.——(Acanthads, *Veg. King.*)

Generic Character.—*Calyx* five-parted. *Corolla* funnel-shaped, bilabiate; segments unequal. *Stamens* four; *anthers* bristled at the base. *Ovary* two-seeded. *Stigma* small, two-lobed, obtuse, equal. *Capsule* clavate, stipitate, the top only seminiferous. *Seeds* (immature) round, margined, smooth. *Lindley in Bot. Reg.*, v. xxxiii., t. 31.

Specific Character.—*Plant* a shrub. *Stem* climbing, round, smooth, dark green, tinged with purple at the parts of the junction of the leaves. *Petioles* short, smooth. *Leaves* opposite, ovate-lanceolate, deep rich green. *Racemes* axillary and terminal, naked, many-flowered. *Calyx* segments narrow, acuminated, clothed with bristly hairs. *Corolla* funnel-shaped, lower part of the tube narrow, dilated from the middle upwards; *limb* two-lipped; *upper lip* two-parted; lower lip three-parted, middle lobe largest, white tinged with pale rose underneath. *Stamens* four, inclosed. *Anthers* deep purple; *lobes* short, blunt at the point, but bristled at the base. *Style* about the same length as the stamens. *Stigma* pale, two-lobed.

Authorities and Synonymes.—Henfreya, *Lindley.* Dipteracanthus scandens of the Nurseries. Henfreya scandens, *Lindley in Bot. Reg.*, v. xxxiii., t. 31.

Under the name of *Dipteracanthus scandens* we first noticed this very handsome plant in our "Magazine of Botany," vol. xiv, p. 68, as blooming in the stove of Mr. Glendinning, Nurseryman, Chiswick, by whom it was first flowered in March, 1847, and was exhibited at the spring show of the Horticultural Society at the Gardens, Turnham Green, when it was awarded a Knightian medal.

The plant is a climber with a very handsome habit, the leaves are large, and of a rich deep green; the racemes grow to about four inches in length, and contain in each eighteen or twenty white mimulus-like flowers, about six or eight of which are expanded at one time; and not being fugitive, the flowering season is extended over a considerable period. It is a native of Sierra Leone, where it grows very common, and where it was discovered both by Mr. George Don, and also by Mr. Whitfield, the latter of whom introduced it to our collections.

Our drawing was made at the Nursery of Mr. Glendinning in April, 1847, and by whom the following rationale of its management was furnished:—

"In the spring or beginning of summer, when the plant has ceased to produce flowers, turn it out of the pot, and divest it of the greater part of the old soil; after which repot in fresh turfy peat and loam in equal parts, intermixed with a small portion of silver sand. The pot should be rather small in proportion to the size of the plant; plunge in bottom heat in a house where the temperature is humid, and ranges from 75° to 80° during the night, and with a partial shade from bright sunlight in the day. As the roots fill the pots shift into larger, using the same kind of compost as before; a few neat sticks should be placed round the pot to support the shoots as they grow, and also a liberal supply of water should be given to the roots. In autumn, when the wood is ripened, remove to a lower temperature, until the plant is required to produce its bloom. Any time from February to May remove it into an increased heat, and flowers will be produced in great abundance, the racemes issuing from the axil of every leaf in succession for several months. Cultivation is effected by cuttings of the half-ripened wood planted in pots of sand, and placed under a glass in heat."

The generic name is given in honour of Arthur Henfrey, Esq., a distinguished botanist.

CHEMISTRY OF HORTICULTURE.

By John Towers, Esq.

(Continued from Page 103.)

We must advance methodically, in order to obtain some consistent view of the nature and operation of agents.

Assuming, as I have done, a position which I hope the student will bear in mind, that every phenomenon in Meteorology has its origin in the decomposition of the sun's rays, when three great elements are developed, the specific agency of which produces definite effects. Now I propose to enter upon the investigation of *water*, and for this particular reason; namely, that its constitution is very simple, and its elements more readily determinable than those of any of the other great natural agents with which science has made us acquainted.

One of the elements of solar light is, unquestionably, *Electricity;* and by that element water has been most completely decomposed, its two elements distinctly and palpably liberated, and in proportions so exactly precise, as to enable a skilful operator to produce again, by recombination, the very same quantity of water as that from which the said elements had been obtained.

Here we must pause for a while, in order to justify our pretension of rendering every chemical term familiar to the uninitiated.

1st. *Analysis* and *Decomposition*, in chemical language, are terms which convey the same meaning; the former is of Greek origin, and expresses the tearing to pieces of any substance not destructively, but so as to dissever and clearly reveal its component elements.

2nd. As antagonist to the process of decomposition, *Synthesis*, a Greek word also, is employed to express the re-union of those principles which have been so separated. If water is exposed to the analytic energy of electricity, its elements are separated, and may be very easily collected and measured, when it will appear that they consist of two aërial fluids or gases, to which have been assigned the terms—*hydrogen* and *oxygen.* These words were introduced by the celebrated French chemists, who, near the close of the eighteenth century, framed the then new and illustrative chemical nomenclature. The former—*hydrogen*—was founded upon two Greek words, which, written in English letters, are *udor*, water, and *gennao*, to generate or produce. I venture, however, to suggest that it would be more correct to invert the terms, and thus to consider *water* as the fountain and principal source of the gas *hydrogen*, which as Dr. Fownes correctly says, "is always obtained for experimental purposes, by the deoxidising of water, of which it forms the characteristic component."

Oxygen, one of the most potent agents of nature, exists in pure water, in a state of electric union with hydrogen. It was first discovered by Dr. Priestley, on the 1st of August 1774, who gave it the name of *dephlogisticated* air. Three celebrated chemists had detected oxygen much about the same period, as will appear from the following passage taken from "Lavoisier's Elements of Chemistry:"—"This species of air was discovered almost at the same time by Mr. Priestley, Mr. Scheele, and myself;" but the palm of priority has been accorded to our English philosopher. Scheele called it *empyreal* *air;* Condorcet, *vital air;* Lavoisier—consistently with the principles of the French nomenclature—gave it the title of *oxygen.* This term was obtained from the Greek noun, *oxus*, acid, and the verb *gennao* or *genein*, to generate, of which *gen* is a contraction. Chemistry, as an inductive science, was then in its infancy; but, under the guidance and industry of the great men of that period, it made surprising advances. Lavoisier considered oxygen to be the sole cause of acidity; and as by direct and incontrovertible evidence it was proved that numerous substances were converted to acids by being united with oxygen gas, he was so far justified in his theory. Recent discoveries have equally proved that acid properties are not wholly dependent upon oxygen, since it is known that the muriatic among several other acids contains no oxygen whatever. Nevertheless, so far as knowledge of chemical affinities then extended, Lavoisier was justified in his opinion, and to this day the name of oxygen is retained.

It will now be essential to appeal to the best authorities we possess, in order to put the student in possession of the opinions generally entertained by philosophers of this surprising agent; after the citation of which it may be useful to extend our theoretical views, especially as a vast unexplored field appears open to legitimate inquiry.

Oxygen is more abundantly diffused throughout nature than any of the other elementary bodies: it forms eight-ninths of the weight of water; about one-fifth of the weight of the atmosphere, and a large relative proportion of the earthy and mineral bodies which form the solid matter of the globe.

The properties of oxygen-gas most immediately noticeable are these: It is devoid of colour, taste, and odour; and being transparent, it is likewise invisible; "It possesses the mechanical qualities of atmospheric air, and therefore can be compressed or expanded by heat and rarefaction; It is heavier than common air, for 100 cubic inches, at a mean temperature and pressure, weigh $34\frac{4}{10}$ths grains, whereas an equal volume of atmospheric air weighs 31 grains; It is but slightly soluble in water, that is, to the extent of one twenty-seventh part of that fluid in volume."

Oxygen gas, we have seen, was at one time called *vital air*, and indeed it can be respired; but vitality could not be long sustained under its stimulus. All the vital functions of the lungs would, for a time, be highly and most fatally excited; and life would be destroyed as by a process of spontaneous combustion. More will suggest itself on this very important fact when we arrive at the consideration of atmospheric air; it will suffice now, in proof of the fact, to state that a most remarkable property of the gas, and that on account of which it was called *fire air*, is the rapidity and splendour with which iron wire, steel filings, charcoal, &c., previously ignited, burn in it. The intensity of the light emitted by burning phosphorus in oxygen gas, is barely tolerable. A light of still greater intensity can be excited by means of the oxyhydrogen blow-pipe, when a stream of each of these water-forming gases is made to meet on a small piece of lime. The experiment is one of extreme delicacy and considerable risk; but, if skilfully performed, exhibits the most magnificent display of elementary illumination that can possibly be conceived.

When powerfully compressed, by a piston forced suddenly upon it in a glass tube, oxygen appears for a moment to become luminous. M. Thenard, however, believed that this luminosity was connected with the presence of some oily or fatty matter, heated by the sudden compression; but this—if the previous phenomenon be of constant occurrence—must be little better than conjecture; and indeed, atmospheric air, diluted as it is by a preponderance of azotic gas, produces a luminous flash when forcibly and suddenly compressed. If then the simple fact be worthy of credit, we may register it among many others, as among the evidences which may be adduced in support of the electrical theory which it will be the object of these articles to advocate.

Professor Brande, when treating on the properties of oxygen, says, "that in all cases of combustion in oxygen, the combustible and the oxygen combine, and the product consequently manifests an increase of weight proportionate to the quantity of oxygen with which it has united." Thus combustion is not a process of destruction, but of the combination of two or more bodies, the product of which always exceeds in weight that of the substance so burnt. If ten grains of common charcoal be burnt in a jar containing pure oxygen, the product will be gaseous, and to all appearance the destruction will be complete (excepting that small portion of ash which results from impurity), but the gas (carbonic acid) produced will weigh more than did the pure charcoal in the first instance. Thus, if six grains of such charcoal be consumed, fourteen grains of carbonic acid will be formed. Again, if the combustible exposed to the action of oxygen gas be a metal—as for example a coil of iron wire of known weight,—the result will be an oxide of iron in its lowest or first condition of oxydation (a protoxide), and allowance being made for impurities and correction, twenty-eight grains of the iron will have acquired eight grains of oxygen, which can be collected and weighed. The reader must now recollect that the "combining number" of oxygen gas in the atomic theory, is always represented by 8, as that of hydrogen by 1, it being the unit upon which English chemists base their calculations of atomic weights; and therefore, when one grain or one hundred pounds of hydrogen gas combine with eight grains or eight hundred pounds of oxygen gas, the representative number of the combined elements will be 9, or, in plainer terms, one of hydrogen and eight of oxygen will produce nine of water. The words "combine" and "combination," by no means imply a simple mixture of the two substances, but their absolute union by electro-chemical energy, effected by a slow, or more rapid and intense, combustion. Now, the former process is incessantly proceeding throughout nature, in the gradual combination of oxygen with combustible substances: thus, for instance, wood and vegetable substances gradually decaying, acquire varying tints, and a change and diminution of substance, till, finally, they disappear; that is, have passed off as invisible vapours. Hence, the air we breathe always contains a very considerable quantity of carbonic acid. Iron, unprotected by paint or varnish, soon acquires a film of rust, which increases till at length the metal becomes corroded, and progressively acquires weight (as a peroxide) in the proportion of twelve parts of oxygen to twenty-eight of pure metallic iron.

All nature abounds with phenomena transcendently and miraculously glorious. Not one particle of its entire substance ever is, was, or can be lost; and the same broad assertion will apply to those ceaseless changes which result from attraction and combination throughout nature.

The question now presents itself: What are those two gases, hydrogen and oxygen—what their individual, specific nature? We meet with no satisfactory answer to this inquiry, and therefore must appeal to direct experiment. If we can imagine two quantities of the two gases to be contained in separate vessels—the hydrogen to be double that of the oxygen in volume—we obtain a correct idea of a simple mixture of those elements which, when chemically united, produce water. Let us, however, assume a form which may present a somewhat natural condition of the two elements, so situated as to permit the perfect union of the two to be effected with great facility. Every one knows that a moist film of soap can be formed into a spherical bubble at the bowl of a common tobacco-pipe. If two such bubbles,—one containing any given quantity of hydrogen gas (say 12 cubical inches), and another just half the volume of oxygen gas (say 6 cubical inches)—be cautiously made to approach each other, the smallest spark of electricity will instantly ignite the two, and produce one volume of watery vapour. If the two gases be previously mixed in a bladder, a soap-bubble so formed will, in consequence of its increased levity ascend, and explode on contact with a lighted taper. Experiments of a similar character are frequently exhibited at public chemical lectures, where also the quantities are exactly measured, so as to leave no doubt of the actual results. A voltaic current of electricity decomposes water, but with great difficulty if the fluid be perfectly pure, and free from any decomposing vegetable or acid matter; and Dr. Faraday has inferred that the quantity of water so decomposed, corresponds exactly with that of the electricity which passes; he also states, that "one grain of water, acidulated to facilitate conduction, will require an electric current to be continued for 3¾ minutes of time to effect its decomposition; which current must be powerful enough to retain a platina wire, $\frac{1}{164}$ part of an inch in thickness, *red hot* in the air the whole time."—*Researches*, No. 859.

Now, though it may be difficult to admit that the electricity which passes as a current, "is simply employed in overcoming electric powers in the body subjected to its action;" yet—as the current from the galvanic trough decomposes water, separates its elements, and causes the ultimate particles of the hydrogen to be so repelled and minutely divided, as to render it the lightest of all aërial fluids that have weight; while, on the other hand, it produces the development of the oxygen at the opposite pole or electrode, and in a state of atomic repulsion, which permits its particles to be eight times heavier than those of its fellow element—I must theoretically infer that the two elements are bodies specifically charged, each with a certain definite quantity or volume of electric or elementary matter, mutually attractive and prone to unite, explosively, and with the extrication of a flash of light if suddenly excited, or more silently, under opposite circumstances.

The theory of electric agency throughout every phenomenon of attraction and repulsion, must be referred to future articles, wherein it will be appropriately appealed to.

ON THE TREATMENT OF THE RENANTHERA COCCINEA TO OBTAIN FLOWERS.

By Mr. Scott, Superintendent of the Plant Department of the Large Conservatory at Chatsworth.

This species of Orchid seems to have been introduced sometime previous to 1817. Up to that period, all that was known of the Chinese Renanthera, by Europeans, was gathered from the work of the missionary Loureiro,—the accounts of travellers in China,—together with a figure possessed by the Horticultural Society of London.

After the species became generally introduced and cultivated in English collections, it does not seem to have been flowered with success. And even at the present time, it is seldom seen in bloom, even in places where the culture of other Orchids is well understood and successfully practised.

Impressed with the opinion, that "the cause of the previous want of success in inducing it to flower has resided in its having been cultivated in too dry an atmosphere," Mr. Fairbairn, at Claremont, applied moss to the stems of his plant,—kept the moss constantly damp, and exposed the plant "as much as possible to the influence of the sun." In October, 1827, a splendid panicle was produced on the Claremont plant, which was figured in the "Botanical Register," vol. xiv.

At Chatsworth it was flowered under rather different circumstances. "About April, 1836, we had a plant put into a small house appropriated to the growth of a few store plants, in which the heat varied from 65° to 70°; it was kept free from moisture, except what arose from watering and occasional syringing," and "exposed to the direct rays of the sun." In three months two panicles appeared, one of which was perfected and figured in the "Magazine of Botany," vol. iv.

The late Mr. Cooper, of Wentworth, flowered it "several successive years," but "never washed his plants over head, nor kept amongst them a heavy moist heat."

Mr. Falconer, of Cheam, has obtained several first prizes at the Horticultural Society's shows, for his superior cultivation of this plant. Mr. Falconer grows his plant on a log of wood; the roots are covered with moss, and the plant is suspended from the back wall of the house, as near to the glass as possible, where it has the advantage of "a high temperature from sun heat, full exposure to light, which, with plenty of moisture to the roots, are the essential requisites which the Renanthera requires to make its flowering certain."

Mr. Bassett, of Westonbirt, has also flowered it well; but I am not aware under what circumstances.

All the specimens of this Orchid, at Chatsworth, are now in the large conservatory, growing on logs of wood, which in some cases are suspended;—in others, one end of the log is fixed in the ground. The plants are from 3 to 12 feet high; and are fully exposed to the sun.

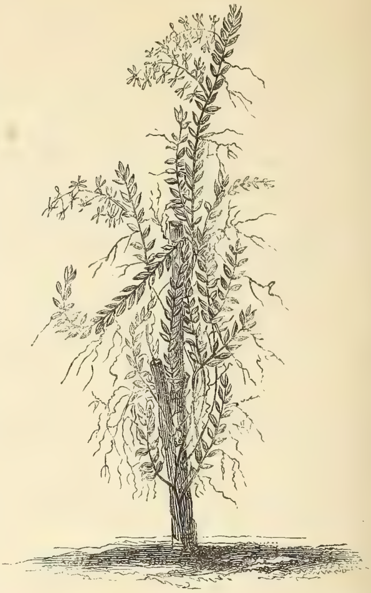
The roots and stems are without covering. In summer they are syringed daily; but during winter water is given in small quantities, once in two or three weeks.

Indeed, the epiphytal character and native country of the subject of this notice, would naturally enough suggest a mode of treatment similar to that embodied in the preceding remarks, as the most likely to prove successful under artificial culture:—in how far it has done so here, the following statement may serve to show. Since May, 1846, one plant has produced fifteen panicles, three of which are now on the plant; another, since May, 1847, has produced four panicles, three of which are in different states of development. A third, during the last twelve months, has produced three panicles, two of which are now perfect.

It is not unusual for the Chatsworth plants to produce panicles in mid-winter; such, however, are rarely so fine as those grown in summer. The flowers in some instances continuing perfect for four weeks.

Certainly no other Orchid will do so well with an equal amount of attention.

But even apart from its lovely flowers, the mental associations which the very appearance of the plant itself is capable of awakening, must, to many minds, afford a large degree of real gratification.



Appearance of the Renanthera Coccinea in the large Conservatory at Chatsworth.

ON THE CULTURE OF THE MAMEY OR MAMMEE APPLE.

The common Mammee Apple is the *Mammea Americana* of our Botanical Catalogues, the *Abricot sauvage* of the French, and the *Wild Apricot* of the Spaniards and English in South America, from the yellow pulp of the fruit bearing some resemblance to that of the Apricot. It is a native of South America and the West Indies, was introduced to this country in 1739, and is associated by Doctor Lindley with the Natural Order *Clusiaceæ* in his "Vegetable Kingdom."

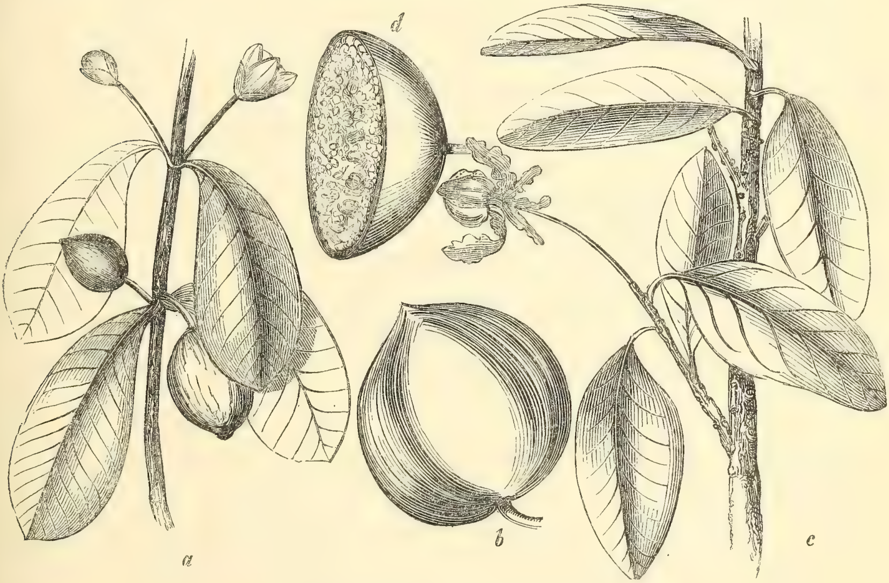
In its native countries where it is extensively cultivated, the tree will attain to the height of 60 or 70 feet, with a large, handsome, spreading head, and bulky stem, and is a very ornamental object in the landscape. The *leaves* are opposite, leathery, six or eight inches long, obovate, very blunt, entire, shining, and of a deep green. *Petioles* short. *Peduncles* short, single-flowered, scattered over the stem and stronger branches. *Flowers* white, sweet-scented, an inch and a half in diameter, male and hermaphrodite on different plants; stamineous trees much smaller in size than the hermaphrodite ones. *Calyx* bractless, of two, sometimes three sepals, deciduous. *Petals* four, sometimes six, arising from two of the segments becoming divided, white, tinged with yellow, deciduous. *Stamens* numerous, free or connected at the base, deciduous. *Filaments* short. *Anthers* two-celled, bursting lengthwise. *Style* short. *Stigma* four-lobed, lobes emarginate. *Fruit* crowned with the persistent base of the style, round, about the size of a small green-fleshed melon, bluntly three or four-angled, four-celled, or only two or three-celled by abortion. *Cells* one-seeded. *Seeds* large, oblong, thick, angular and very bitter to the taste.

This fruit is said by some persons to rival the Mangosteen, but although it is larger than that fruit and of a very agreable flavour, it by no means possesses that delicate richness belonging almost exclusively to the Mangosteen, indeed the Mammee is considered too strong and gross a fruit for weakly stomachs. The fruit is covered with a double rind, the outer one is bitter and resinous, leathery, a line in thickness, tough, and of a brownish-yellow; the inner one is fine and membranous, yellow, adhering closely to the flesh, which is of a firm consistence, bright yellow, and has a singular but pleasant taste, and emits a delicious fragrance. It is either eaten alone, or cut into slices and eaten with wine and sugar; it is also boiled with sugar into a jam, in the same manner as Apricots are. The flowers are distilled in Martinique with spirits, and an aromatic drink is procured, which is said to be a stomachic, and is called by the natives *Eau Creole.* A wine is also obtained by fermenting the sap; the seeds are anthelmintic and have been used in medicine. The sap of the plant is employed to destroy the chiggers (*Pulex penetrans*), insects remarkably troublesome to the inhabitants in hot climates. The timber is full of resin and being hard and very durable, is esteemed for many domestic purposes.

Besides the American or Common Mammee Apple, several other species have been discovered, some of which probably bear fruit fully equal to the one mentioned, none however have hitherto been introduced; of these may be noticed:—

THE AFRICAN MAMMEE-APPLE (*Mammea Africana*). A native of the Mountains of Sierra Leone, where it forms a tree 60 feet or more high, with a broad spreading head. The *leaves* are oblong, acuminate, dark-green, blunt, shining, and abounding in a resinous yellow gum. *Flowers* white, solitary, and produced on the old wood. *Fruit* double the size of a large Apple, the outer rind is thick, brown, and of a bitter taste. The *flesh* is firm, melting, of a bright yellow, and in point of flavour quite equal to that of the *M. americana.* The wood of the tree also is very durable and forms good timber.

THE MEXICAN MAMMEE APPLE (*Mammea emarginata*), is another good fruit-bearing kind, growing in the Mountains of Mexico. The tree is less in size than either of the preceding, and the first does not exceed the dimensions of a moderately sized apple, but has a good flavour, and deserves the attention of cultivators. The *flowers* are white like the last, and the plant wears a similar aspect, and has much the same habit.



DESCRIPTION OF THE WOODCUT.

a, Branch of Mammea Americana, showing the inflorescence.
b, Fruit of the same.
c, Monodona Myristica.
d, Portion of the fruit to show the disposition of the seeds.

In cultivating the above species the same general treatment may be given to each; the soil should be light, sandy and rich; a mixture of two parts light turfy loam, and one part sandy peat, with a little rotten manure mixed, if the plants are grown in pots or tubs; but if they are turned out in a prepared border, any light rich turfy loam, rendered open by an addition of sand, will answer every purpose.

The general temperature in those countries where the plants naturally grow, is high and very humid; they therefore require with us a heat not lower than 75° as an average in the growing season, with a very humid atmosphere; in the dry season 70° with a moderate moisture; and in winter fron 50° to 55° with a dry and airy situation.

Whilst the plants are in vigorous growth, water with weak liquid manure made from sheep's droppings, also syringe over head every fine day. Admit a free supply of air at all times when the weather will permit.

Propagation is effected by seeds and cuttings. The seeds are sown in pots of light soil, and plunged in heat. Cuttings are made of the ripened wood, which should be planted in pots of sand, covered with a glass and plunged in heat.

THE AMERICAN; OR, CALABASH NUTMEG.

The American Nutmeg is the *Monodora Myristica* of our catalogues, and the *Anona Myristica* of *Gaert. Fruct.* It is probably a native of the West of Africa, and may have been brought by negroes to South America, where it is said to grow 20 or 30 feet in height, with a wide spreading head. It is associated with the Natural Order *Anonaceæ.* The *leaves* are confined chiefly to the extremities of the branches, distichous, alternate, oblong, entire, smooth, shining, of a bright but pale green, about four inches long, and nearly half that breadth. *Peduncles* opposite the leaves, single-flowered, round, smooth, greenish-white, pendulous, five inches or more long. *Flowers* fragrant; at first white, and spotted with red, but becoming deep yellow, with darker spotting as they become older. *Calyx* monophyllous, divided into three unequal curled sepals. *Corolla* monopetalous, much longer than the calyx, tube short, *limb* divided into six segments, arranged in a double series; outer segments three, crisped at the margins, bright yellow, marked with spots and stripes of reddish-brown; inner segments three, about a third shorter than the outer ones, pale-yellow, spotted with crimson. *Stamens* closely set, in ten or twelve rows on the receptacle. *Fruit* the size of an apple, round, smooth, one-celled. *Seeds* imbedded in the pulp, muricated.

This plant has not yet been introduced to Britain, but certainly deserves the attention of collectors. The fruit grows to the size of a large apple, and becomes, when ripe, of a rich golden yellow; the pulp is soft, sweet, and is said to possess a pleasant flavour. The seeds, which are very numerous, are reputed to rival the true nutmeg for the richness of their aroma, being copiously impregnated with an aromatic oil, so nearly resembling that of the Eastern spice, that no perceptible difference can be discovered, except that the American kind is less pungent than the East Indian one.

The plant was introduced to Jamaica for the purpose of cultivation, but at present the introduction has not altogether answered, as a few years ago it was all but lost to that island.

If brought to this country it would no doubt grow in a mixture of light turfy loam and sand, and would require a strong and very moist heat.

ON THE ADAPTATION OF THE TREE VIOLET FOR THE EARLY SPRING DECORATION OF FLOWER GARDENS,

WITH A NOTICE OF ITS USE FOR THAT PURPOSE AT HIS GRACE THE DUKE OF BEDFORD'S, OAKLEY.

By G. T.

The fine fragrant flowering plant, commonly known as the Tree Violet, is only a variety of the common species (*Viola odorata*), and is supposed to have been brought a few years ago from China, where it is stated to assume a tree-like form three feet or more high. When first introduced it was regarded by many as a stove plant, and subsequently was thought to require the shelter of a greenhouse; and indeed in such situations alone does it in any degree assume an arborescent habit. When grown in heat, however, the production of flowers is very limited, and their fragrance is by no means so powerful as when exposed to the full influence of the air. It is perfectly hardy, and will endure the full severity of our winters without protection, forming a low herbaceous plant like the other kinds, and is in that form best suited for supplying flowers at all seasons of the year, except during the very depth of winter. It is well adapted for a bedding plant, and in such a situation makes a much greater display than any person who has not seen it so grown could possibly suppose; at Oakley, the seat of his Grace the Duke of Bedford, this has been especially exemplified this spring. The plants grow closely together, so as to form a dense carpet of green and blue; and although the foliage was both healthy and abundant, the bed presented a complete mass of inflorescence standing erect above the leaves, which the immense number of flowers partly concealed.

The following few particulars of their management at Oakley may not be uninteresting:—A quantity of plants which had been grown under glass in pots were, after having been forced, turned out into a spare border in the kitchen garden, during the month of March; with the exception of occasional waterings in dry weather, they were permitted to take their chance, and after throwing up numerous radical shoots they speedily lost their arborescent appearance, and grew together as vigorously and compactly as the Neapolitan kind. The following winter, which was one of average severity, proved their hardiness, as without any protection they were observed the following spring to be equally as unscathed as the Russian variety; and by the end of February they commenced blooming, and continued so through the two succeeding months, but, as might be expected, the flowers were neither fine nor numerous, having been forced the previous winter, and neglected during the subsequent summer.

Encouraged, however, from their hardiness to bestow more pains upon their cultivation, some well-decomposed vegetable matter was bestrewn by means of a coarse sieve amongst the old plants, about two or three inches deep, in the latter part of April; and after receiving this top-dressing, the plants were supplied with copious waterings of weak liquid manure, which of course induced a most luxuriant growth, and thus the object of obtaining plenty of vigorous runners was accomplished; for towards the middle of May the bed was completely covered with robust, well-established young plants, the old ones being scarcely any longer recognisable. In order that the young plants, or newly-rooted runners, might be cultivated as highly as possible, it was thought advisable to transplant them into a fresh situation and new soil; accordingly, in order that they might enjoy the additional advantage of partial shade, a border beneath the garden wall on a western aspect was selected for the purpose. The ground, being previously well forked over, was surfaced with rather strong maiden loam and peat, rendered tolerably friable and open by the admixture of some sharp sand and charred ashes, to the depth of three or four inches; and, being made level and tolerably firm, was lined out for planting in rows, and the plants were placed one foot apart from each other.

In taking up the runners, all the strongest and best were selected, and care taken to retain as much root as possible, but divesting them of most of the old soil. Excepting the very weak ones, one plant only was inserted in each allotted space, and the planting being finished, a copious watering was given to settle the soil around them.

Throughout the summer their treatment was similar to that of a strawberry plantation, consisting of frequent applications of weak liquid manure given towards evening in dry weather; particular care was taken to divest them of all "runners" as repeatedly as they made their appearance, as their removal if delayed might prove detrimental to the future strength of the plants.

The plantation grew amazingly, the soil amongst them being frequently hoed and scarified to destroy all intruding weeds in embryo, and keep the surface open for the admission of air and rain, or liquid artificially supplied, the latter being administered copiously to obviate the effects of drought, and complete their growth in the hottest weather; but by the end of summer these artificial waterings were discontinued altogether, in order that, after being so highly cultivated, the plants might be enabled to mature themselves for withstanding a severe winter, should such occur.

Towards the middle of September all the finest plants were selected for the flower-garden, and a bed, whose autumnal beauty had already departed beneath the blighting influence of early nocturnal frosts, was prepared, by trenching down the blackened remains of former beauty, top-dressing with leaf-mould or a little rotten dung, which was lightly forked into the surface, and the bed levelled for the reception of the plants; they were then carefully lifted, with good " balls " containing almost every rootlet, and immediately inserted so closely as almost to touch each other when planted. They were placed rather deep in the bed, the soil being loosely drawn around each plant, and the bed surfaced with a mixture of dry soil, wood-ashes, lime or charcoal dust, to preserve them from the depredations of slugs and other vermin, as also to prevent the immediate action of frost upon the young and tender roots, and for the latter purpose the dry top-dressing was occasionally renewed throughout the winter.

The plants rooted freely in the bed; and, on the return of spring, they very soon became a compact mass, and in the latter part of February commenced blooming, as we have already described.

Their after-treatment this season, we were informed, would be precisely a repetition of what was adopted last year, with the exception, however, of thinning a sufficient number of the plants at once (after flowering), so as to enable the usual top-dressing to be given, and thus obtain strong plants for transplantation to a border in the kitchen-garden, &c., and receive the rationale of last year's treatment.

The Tree Violet is also admirably adapted for forcing in the herbaceous, as well as in the arboreal state, in the same way that is usually adopted for the Neapolitan, either in 48 or 32-sized pots, or planted on a very gentle hot-bed under the protection of a frame.

Besides possessing the tendency to bloom more freely than the Neapolitan, it is decidedly superior both in point of hardiness, beauty, duration, and fragrance. An old pine-pit or melon-frame, with an exhausted bottom-heat, would be all the forcing the plants would require; or, if these were not at command, a slight hot-bed formed of spent fermenting materials, about 2 or 3 feet in thickness, and covered with a compost of stiff loam—leaf-mould and sharp sand, would answer well for them. They may be taken up and planted when the others are disposed for flower-garden decoration, or if ten days earlier, perhaps, they would the sooner be induced to bloom. During winter, they must experience a free circulation of air at all times; and in mild weather the lights may be altogether drawn off; but they must be carefully protected from rain and frost by lights and mats, or they will not flower at the desired time—mid-winter.

Should " rot " or " damp " affect them—which in this situation, during the " dark days before Christmas," is not improbable—sharp sand, quick-lime, wood-ashes, or fine charcoal dust, will require to be freely disseminated over and amongst them at intervals; and this will likewise suffice to prevent the depredations of snails, &c.

Very little, if any water, should be given during winter; but if it is found requisite to moisten them a little, advantage must be taken of a bright windy morning to perform it, with the water in a warm state, conveyed from the spout of a waterpot introduced between the plants, so as not to wet the foliage; and, if a nice comfortable warmth and dry atmosphere be kept up about them, they will flower freely enough by Christmas time.

As Tree Violets are preferable in that form for adorning the drawing-room vase or flower-stand of a lady's boudoir, a few remarks on their management may not be out of place:—

The stoutest young plants in the open ground plantation should be encouraged to develope their prostrate stems as vigorously as possible by the middle of July, when, if a single stem is preferred, the strongest must be selected for training upright, and the others cut away close to the base, in order that all the vigour of the plant may be concentrated in the remaining one.

They must now be potted into 32 or 48-sized pots, care being taken to preserve all the roots in lifting them out of the ground. A compost of equal parts fibrous peat, turfy loam, and leaf-mould, with the addition of a little sharp sand to preserve porosity, they delight in; and secure drainage may be obtained by placing an inverted " thumb " or 80-sized pot over the aperture, and over this flakes of leaf-mould or lumps of green turf.

They should be potted firmly, and have a neat flower-stick inserted for supporting them for a year or two; and after being well watered, should be plunged to the pot-rims in coal ashes, in a pit or frame facing the north, until the middle of September, all the caulescent and radical shoots being previously removed, the leading shoot and leaves at the summit only being retained from the time of potting. They will be fit for forcing the same season; but if the object is rather to produce fine plants than an immediate display of flowers, forcing or flowering at all must be deferred until the second year, and the plants allowed to continue at rest in the cold pit until spring returns, when they should be introduced into a warm, airy greenhouse, and induced by frequent waterings of weak liquid manure, formed of cow-dung, to grow rapidly, continuing the removal of superfluous leaves, side shoots, and flowers throughout the summer, when they will have become fine plants with a stout stem, a foot or eighteen inches high, with a large tuft or crown of leaves at the summit. At this time they must be hardened off in a dry, airy, cold pit, to be in readiness for forcing in a light, warm, airy greenhouse or pit, without bottom heat, in preference to the stove or regular flower-forcing pit, the temperature of the latter being found too high for inducing a florescent habit in what may now appropriately receive the appellation of *Viola arborea.*

A HINT OR TWO ABOUT ANNUALS.

By Mr. Kemp, The Park, Birkenhead.

Since the beautiful Verbenas, Petunias, &c., with which flower-gardens and borders are now so largely decorated, have come into general use, the scarcely less beautiful tribe of annuals have gone very much out of fashion, and are chiefly employed in those gardens where the more tender things above mentioned are hardly accessible. Such a curtailment, however, of the ornamental resources of a place, so clearly occasions a diminution of its attractiveness, that a few words in favour of the older and partially discarded summer flowers may be deemed, perhaps, less an act of charity than justice.

The greatest drawback, as we conceive, to the employment of these comparatively fugitive productions, is their want, in general, of any marked character. Being mostly small, loose growing, and easily dashed about by winds and rain, and being commonly sown in small patches, they seldom produce a striking effect, and their naturally short duration is virtually abbreviated by the action of winds and storms. This is in consequence of their being unable to support themselves, and not being thought worth the trouble of staking.

All this arises, however, from the meagreness of the patches in which they are sown, and the extent to which these again are usually thinned out.

Annuals, in order to the development of anything like their true beauty, should always be sown in broader masses, and the plants left tolerably thick. Two, three, or four square feet at least, should be appropriated to each group. For by this means alone can their perfect growth and production of flowers be secured, and they will thus also be enabled to support each other against the action of wind and wet. Having been accustomed to grow them thus in beds and masses for several years, we may safely affirm that those who have only grown them in the usual stinted patches, can have no idea of their real beauty. They are almost universally unfitted for forming single specimens, not being sufficiently strong, sturdy, or free flowering; and it is only when they are cultivated in large groups that they show themselves in their true character.

But besides this radical defect in the ordinary mode of treatment, they are often raised in reserve gardens or beds, and transplanted into the pleasure-grounds. Except for flower-gardens, where a constant display of bloom is required, the transplantation of annuals, however carefully performed, and even in the most favourable weather, is a very undesirable practice. It invariably weakens and impoverishes the plants, and prevents them from growing luxuriantly and flowering finely; taking from them, in short, that richness and luxuriance which is their chief merit, and resolving their culture into that of individual plants instead of masses. We would advise, therefore, that all annuals, unless it be those which are very tender, and have to be reared in frames, should always be sown where they are to flower.

To obtain from annuals, moreover, their full meed of ornament, more attention should be paid to having successions of them than is usually given. Many of them only last a fortnight, three weeks, or a month, and of these regular sowings should be made at corresponding intervals, so that there may be some of each sort always in bloom. There are a very few which, by a little care in cutting off their seed-vessels, may be kept in flower all the season, and of these it will, of course, not be necessary to renew the sowings. It will be much better, by adopting this plan of successional sowings, to have part of the ground to be devoted to them unoccupied at first, than that they should all come into blossom at once, and all, likewise, except the few more durable ones, go out of flower at the same time.

But it is especially desirable to have annuals in bloom both early in the spring and late in the autumn; and if this were more commonly aimed at, they would undoubtedly retain their place as general favourites. Every one loves flowers that appear early; and annuals that come into flower in April and May generally last twice as long as those of June, July, and August. In autumn, too, when the tints of the leaves are changing, and most of the summer ornaments have altogether vanished, or been spoiled by slight frosts, a few remaining patches of annuals serve to prolong the gladsome season, and are thus particularly welcome.

Most of the really hardy annuals will stand through the winter of our climate, if only ordinarily severe. For spring flowering, they may be sown towards the end of September or beginning of October; and if the somewhat absurd practice of digging over the borders in winter is adopted, the place of each group should be marked by a small stick, to prevent them from being dug up. For ensuring a good autumnal bloom, two sowings may be made at different periods in the month of August.

THE MYRTLE.

For many ages the common Myrtle (*Myrtus communis*) has been held in high estimation; with the ancients it was also a great favourite, and was dedicated by them to Venus. The uses, both for domestic purposes and in medicine to which it was applied, were numerous. The young aromatic flower-buds and full grown unripe berries were generally eaten as spices, and were also used for that purpose in cookery, and a variety with white berries was, in the Greek Archipelago, considered superior to any other kind. The natives of Tuscany, at the present time, apply the berries to the same purposes we do those of the Clove Pepper (*Caryophyllus aromaticus*), to which in flavour they bear some resemblance; but the leaves and berries of another species, *Myrtus pimentoides*, have exactly the smell and taste of the latter well-known spice.

The branches and berries macerated in wine impart to it a peculiar aroma, and it received in consequence the name of Myrtle Wine or *Myrtidanum*, and something of the kind is still drunk and esteemed in Tuscany. The fine perfume known by the name of *Eau d' Ange*, is composed of little else than the distilled water of Myrtle flowers. The bark is also used in Italy, Greece, and some other countries, for tanning leather, in the same manner that we use that of the oak and larch. The leaves dried and powdered have, it is said, been substituted for sumach. All parts of the plant were considered useful in medicine, and the branches were considered symbolical of power and authority; wreaths also of the branches, mingled with fragrant flowers, were placed on the heads of persons to whom particular honour was intended at their festivals.

The Myrtle has always been greatly valued by the Jews, and was one of the plants directed to be used in their religious ceremonies at the Feast of Tabernacles; on this account it appears to have been extensively cultivated in Judæa and also throughout

Palestine, and from Sacred History it would appear to grow to a large size (Zachariah, i., 8). The variety, however, most esteemed by them, is a kind with broad leaves, very bushy in its growth, from the circumstance of its leaves usually growing in threes, instead of pairs, the usual character. It is a very ornamental and compact growing shrub, and not uncommon in our old plant collections; Miller called it in his day the Italian Myrtle, from its having been introduced to Britain from that country.

It is named by the Jews, *Aboth*, and is mentioned in the sacred writings in connection with the Citron, Date-Palm, and Willow, (Leviticus, xxiii., 40). The Jews were commanded to take the fruits of goodly trees (*Citron*), branches of palm trees (*Phœnix dactylifera*), the boughs of Aboth or thick trees (*Treble-leaved Myrtle*) and willows of the brook; with these their booths were decorated, and the feast continued seven days, and as far as practicable, the same rules are followed at the present time. The union of these plants was termed *Arbang minim*, and was considered symbolical of the relation existing betwixt the Deity and his creation—the Citron (*Esrog*), representing the Creator himself; the Palm-branches (*Looliff*), the spiritual portion of the creation; the three-leaved Myrtle (*Aboth*), the visible heavens including the whole stellar system; and the Willow representing the earth with all its varied inhabitants.

The common Myrtle is a native of Persia, but was introduced at a very early period into the South of Europe, and also into many other countries, where upon the rocks and hill sides it has become quite naturalised, and is now found growing wild, as common as is the furze of this country. It was introduced to Britain nearly 200 years ago, and has always sustained its character as an universal favourite. With us it forms a broad spreading evergreen shrub, and exhibits in its numerous varieties a great difference in character, foliage and habit.

THE BROAD-LEAVED (*M. communis Romana*), is the common flowering Myrtle, as it is called, because of the great freedom with which it blooms with us.

THE BOX-LEAVED or Tarentine (*M. com. Tarentina*), is a small leaved kind, very common, and flowers very late in the season.

THE ITALIAN OR JEWS' MYRTLE (*M. com. Italica,*) is an upright-growing broad-leaved kind, very often producing its leaves in threes, but is liable to great variation.

THE BLACK-FRUITED MYRTLE (*M. com. Melanocarpa,*) is often seen with double flowers; is rather hardy, flowers freely against a wall, and becomes loaded with its black fruit which are generally eaten by birds.

THE BROAD-LEAVED DUTCH MYRTLE (*M. com. Belgica*), generally a very free flowering kind, of which there are several varieties; one bears double flowers, and others differ in the foliage and size of bloom, the leaves are crowded and of a very dark green.

THE WHITE-BERRIED MYRTLE (*M. com. leucocarpa*). This is a native of Greece and the Balearic Isles, it is a handsome kind, the fruit grows large, is white when ripe, and has a very pleasant aroma, on which account it is made much use of as a spice.

THE NUTMEG, OR PORTUGAL MYRTLE (*M. com. Lusitanica*). Of this kind there are some striped varieties, it has a small leaf and forms a very pretty shrub.

THE ORANGE-LEAVED MYRTLE (*M. com. Bœtica*). This is a handsome kind, having also variegated varieties.

THE THYME-LEAVED MYRTLE (*M. com. mucronata*). A dwarf narrow-leaved kind, less known than many of the others.

In point of cultivation nothing is easier than the management of these plants; in the southern counties of England they flourish and grow to a large size when planted against walls, and in warm, well-drained situations in the shrubbery, where they endure a moderate winter without shelter: they are not however capable of bearing intense frosts, and are therefore commonly protected with a mat, which is removed in mild weather. They flower abundantly all the summer and autumn, and are useful plants for conservative walls, windows, or cool greenhouses, if even there is a deficiency of light. They thrive potted in any light rich soil; cuttings strike freely planted in pots of soil, or even under a handglass in the open air. Several excellent specimens have been introduced of late years, but none surpasses the *Myrtus communis* for beauty or are so easily managed.

ON THE CULTIVATION OF VARIOUS KINDS OF MELONS.

By G. T.

The melon has been cultivated in this country many years, but the precise period of its introduction is scarcely known. Most of the original sorts have been long since discarded, and their successors, the Cantaloupes and Romanas, although deservedly esteemed, have in a great degree been superseded by others of Indian or Persian origin, for the introduction of which we are indebted to Botanical travellers, and scientific officers of the Indian army, who not only forwarded home seeds of some of the best Melons in cultivation, but also included directions for their management; and the present notice is mainly intended to introduce a few practical observations respecting the Cabul and Persian kinds, which when properly grown are exceedingly delicious.

With respect to structures for the growth of this fruit, none are equal to houses or pits heated by means of hot-water pipes and tanks; for although good fruit can be obtained from dung beds, and the old constructed pits, yet a Melon-house is in every respect preferable, either for ornament, utility, convenience, cleanliness, or economy.

As an ornamental structure, the Melon-house may form part of the range of Vineries, or Peach-houses; and when the fruit hangs cradled from the roof, in different stages of growth, and exhibiting various colours, according to age or kind, such a structure becomes truly ornamental.

In point of utility much may be said, to show to how many useful purposes the skilful, contriving gardener can convert such a structure.

Late in autumn when the last Melon crop is gone, he will force roses, pinks, and other flowers; cultivate stove-plants intended for bouquets or decorative purposes, and force in pots or tubs, plunged over the tanks, grapes, peaches, figs, or cherries, according to the extent of his Melonry, or the particular requirements of his employer.

On the return of spring, a few Melons will be introduced for the earliest crop, and as grapes, &c., ripen off in February, March and April, the house can be again entirely devoted to the production of Melons, until the succeeding winter.

For cleanliness and convenience, there is no comparison betwixt it and forcing on the old dung-bed system, for besides the unsightliness of the litter attending the latter, the growing fruit can never be viewed to advantage, or approached but with inconvenience, both which objections are entirely obviated by erecting a house for the purpose.

The compost most congenial to the well-doing of the latter, we have found to be a good substantial loam, taken from the surface of a common or pasture, with all the inferior vegetation adhering to it; if sheep or cattle have long been fed upon it, so much the better; it should be used fresh dug and roughly chopped to pieces, without any admixture of a stimulative character whatever. We have, however, known the best success attend their being planted in the scrapings of ditches, and in mud obtained from the bottom of stagnant pools, after having undergone considerable exposure to the atmosphere, and having a good substratum of roughly broken lumps of turf sod, in a fresh state, beneath the compost; and this would seem to be the most natural medium for them to root in, when we reflect that in countries whence they come, the Melon is made to grow in beds of rivers from which the water has receded, the stream at this period of the year being confined to the small part of the channel, and hence there is an ample and constant supply of moisture at the roots: for since the beds are composed of nothing but the natural shingle, or loose gravel which forms the bed of the river, the water is consequently enabled to percolate freely beneath their whole extent.

Whatever soil or compost is employed for the growth of Melons, we deem it of the greatest importance that it be in as rough and lumpy a state as possible, with no other admixture than an abundance of broken bricks, potsherds, lumps of charcoal, broken bones, &c., to preserve porosity in the mass, as well as absorb moisture, and thus ensure a hollow humid medium for the roots to extend in, and protrude themselves through; for it will be found upon observation, that the roots of Cabul and Persian Melons delight to cling to and ramify among the rougher portions of soil, drainage, &c.

These kinds of Melons require a considerable depth—say 20 inches or 2 feet deep, of compost, with the addition of a 6-inch substratum of rough turfy materials to root in; and if tolerably dry by the time the plants are ready for insertion (for the earliest plantation a moderately dry condition of the soil is indispensable), the tender rootlets will soon become both numerous and healthy.

We will now presume that all necessary arrangements for turning out the plants are complete; and whether the structure they are about to be grown in be a Melon-house, or one of a common kind, we recommend for the full extension and healthy development of the energies of each plant, that one plant only be grown beneath each light, otherwise the structure will be crowded with a superfluity of vines and foliage.

In planting, it is a good plan to mix a trowel or two full of leaf-mould and sand with the soil, where the plants are to be immediately inserted, after which a slight watering (the water being of the same temperature as the compost) should be given to settle the soil around them.

The planting finished, the leading shoot or point should be pinched out so as to leave two eyes, or buds, for the formation of two shoots, if in a house; but if in a frame or pit, it will be found requisite to allow the plants to attain four or five joints prior to the stopping process being performed, so as to ensure a similar number of vines or runners to furnish the bed. In either case these main shoots should not be stopped or pinched back, until such time as they have reached the top of the trellis or sides of the pit.

No laterals, excepting those on which the fruit are formed, should be permitted to remain on the vines or main shoots, or a superabundance of shoots will be the consequence.

It is a point of the greatest importance, that the leaves be allowed abundance of light and room, and are preserved as luxuriant as possible, in order that the fruit may attain the maximum of perfection; for by allowing only a proper number of vines or runners to each light, and by timely methodical attention to training, stopping, and thinning out the superfluous shoots, we have known both the Persian Green Flesh and Cabul Melon develope such magnificent foliage, as to be mistaken at first sight for Cucumbers instead of Melons.

In removing the superfluous shoots (an operation as beneficial to the Melon as it is to the Peach), the greater portion of the male inflorescence (a few flowers only being reserved for fertilisation) should be rubbed off also, and until such time as a sufficient quantity of blossoms have expanded none should be set or fecundated, so that the operation may be accomplished on the required number at once; for, if performed at different periods, a very imperfect unequal swelling and maturation of the fruit will be the consequence: and that the energies of the plants may not be too severely taxed, no more than four or five fruit should be allowed to be borne by each plant for the first crop; but by the regular, oft-repeated administration of liquid manure during the swelling period, we have frequently seen seven, and, occasionally, as many as ten fruit of the beech-wood variety, averaging five pounds in weight, brought to the greatest perfection for the first crop, and afterwards a second and third crops of corresponding weight and quality.

When the fruit are about the size of hen's eggs they will generally require to be supported by means of small projecting shelves or rests, attached by string or wires to the trellis on which the plants are trained, and on these supports the fruit will recline without danger or risk of the stalks being broken, which they are sometimes liable to be by their own weight.

In pits or frames the case is different, a tile, a slate, or pane of glass must be introduced beneath the fruit, upon the surface of the bed, now rendered even and tolerably firm; and to prevent the soil cracking or becoming too dry, it is advantageous to cover the surface with fine sandy soil. We have even seen used for this, and for the purpose of absorbing heat, Melon beds completely surfaced with lumps of charcoal.

We now arrive at the most important points to be taken into consideration in the successful culture of these Melons, namely, the practical application of heat, humidity, &c.,

consonant with the amount or intensity of solar influence obtainable in this our beclouded clime.

Over the agency of heat we have now a tolerably good control, but with light (notwithstanding the great artificial improvements that of late years have occurred to render our glass-houses much more transparent than formerly) we are circumstanced widely different; and the science of a right application of the former in the case of the Persian Melon, does not consist in the precise imitation of the degree under which that plant luxuriates in its native habitat, but rather in balancing it, so to speak, with the quantity of light locally obtainable.

Until the fruit have "set" and begun to swell off, the only application of moisture (always in a warm state—this circumstance is of the greatest importance) which will be requisite is to take advantage of all bright weather, and close the structures early, with a highly humid condition of the interior atmosphere; but the plants themselves should on no occasion be either watered or syringed overhead, inasmuch as half the ills that Melons are heir to are but the consequence of this practice. Ventilate partially at night on all occasions when the external atmosphere will admit, and give air in the day-time with the greatest freedom (but never shade) on the brightest days. Above all, it is important that aëration be attended to early in the day, for nothing is more injurious to Persian Melons than permitting the sun to shine upon them under glass for any length of time previous to a free circulation of air being given, when the more sunshine they receive the better. The foregoing material points in their culture being carefully attended to, a rapid and yet robust habit of growth will be the result. The vines will not present a languid appearance, but will be strong and vigorous, upholding fine healthy foliage, which (if the diurnal atmosphere be kept tolerably dry, and all the sunlight possible admitted), notwithstanding the rather low and humid condition of the nocturnal temperature, will never fluctuate or become flaccid, but rather attain a healthy rigidity of structure beneath the fiercest rays of our brightest summer's sun.

A good supply of clarified liquid manure must now be kept in constant readiness: it may be manufactured either from the manure of sheep, deer, or cows—some give preference to guano—but whatever is selected, it should on all occasions be employed in a very clear, tepid state, well diluted with warm water, and occasionally a trowel or two full of soot may be intermingled with it, if only to exterminate the worms.

"Weak and frequent," should be the maxim for its application; every alternate day in bright weather during the fruit-swelling period will not be found too often to apply the liquid manure, which should be done by means of a water-pot without a rose.

Shortly before closing the structure in the afternoon is the best time for watering, which must be performed in pits or frames, by introducing the spout of the pot carefully amongst the vines and foliage, so as to completely saturate the entire mass of compost without in the slightest degree wetting them.

A circle of dry soil should be drawn around the main stem or collar of each plant, and water never permitted to approach within five or six inches of it, as it is this part of the plant which is the most likely and fatally to be affected by the "canker" disease, which is superinduced sooner by stagnant moisture coming in contact with the stems than by any other cause with which we are familiar. As a general rule, it is better to apply the water towards the outsides of the Melon beds, still the whole must be thoroughly saturated and rendered on all favourable occasions more like a "hot ditch" than Melon beds are generally met with; and if the soil is of the coarse and open texture before alluded to, porosity will be preserved, and the plenitude of water supplied will consequently never cause stagnation; in the mean time, the plants will carry heavy crops of splendid fruit, which will rapidly complete their swelling pretty evenly together; and the moment that it is perceived this is accomplished, further waterings must be immediately discontinued, and the soil allowed to become perfectly dry, which it will do by the time the fruit ripen off. Attention to the timely withholding liquid manure at this important juncture will alone secure a good flavour to the fruit, which, if otherwise neglected, will prove watery instead of sugary.

For second and third crops, Persian Melons must be subjected to the routine of pruning back to a healthy young shoot, thinning out the old vines, &c., as is practised towards other sorts.

We have obtained as many as five crops of fruit in one season, from the same plants, of the Greenflesh variety, grown in a three-light pit, numerically sixty-six fruit of excellent quality, averaging from four to six pounds weight—some of the finest weighing seven pounds each. Thus much for the fructiferous habits of the plants under systematic culture, and the judicious appliance of manure in the liquiform state.

In conclusion, if the Melons of the East resemble in their aqueous manner of growth a sub-aquatic rather than the tender land plant of other countries, we must remember that it is only in climes where the "sun showers triple light," excessively moist situations are preferred by them; but cultivators, extracting a useful lesson from Nature's universally instructive volume, and taking advantage of the brightest gleams of sunshine that this fickle climate of ours is favoured with, may accomplish a more perfect artificial cultivation of these Melons in Britain than is perhaps ever naturally attained even in climes intensely hot and brilliantly bright.

We have said nothing of remedial measures for the attacks of the red spider, &c., as we deem a wholesome, vigorous system of culture, followed up with zeal and vigilance in detail, quite "pest proof."

DESCRIPTION OF THE MELON HOUSE AT CHATSWORTH.

Fig. I.

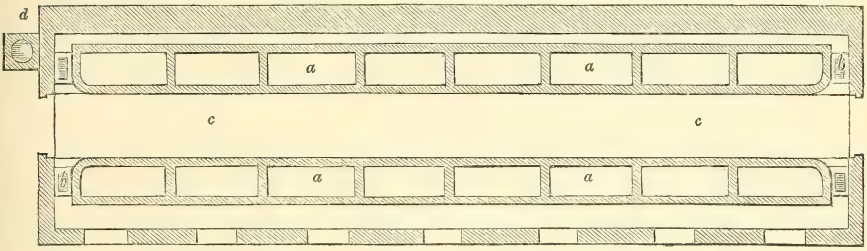


Fig. II.

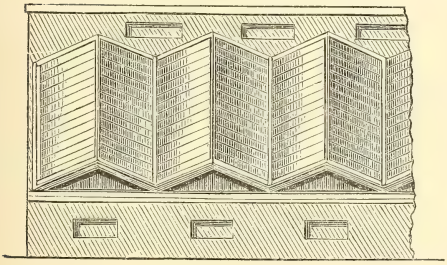
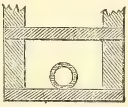


Fig. IV



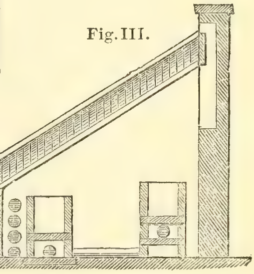


Fig. III.

SCALE, 1 inch to 10 feet.

Fig 1. represents the ground plan (on a scale of one-tenth of an inch to a foot), in which are shown the different pits over the tanks (*a a*); with two small cold-water cisterns at each end, for the supply of water, and to give access to the tanks (*b b*); the trellis wooden pathway (*c*); and boiler (*d*). Between the back range of pits and the back wall, there is a vacuity of 4 or 5 inches, for the free circulation of air; and between the front pits and front wall, there is a vacuity of 12 inches, also to admit the free circulation of air from the ventilators shown in the front wall, and to make room for the hot-water pipes, shown in the section.

The clear width of the house inside is 10 feet: the length will of course depend on the supply of melons required.

The trellis pathway is constructed of larch boards, 4½ inches wide, by 2 inches thick, and a ¼ of an inch apart, resting on sleepers 4 by 5 inches, supported by brick piers.

The house has a southern aspect, and is built against a garden wall, 1 foot, 10½ inches thick. The front and end walls are built of 9 inch brick, and the pit walls of 4½ inch brick on bed, plastered, with a wooden capping, on the top of the bricks, and finished with a square skirting to the pathway.

Fig. 2 represents a portion of the front elevation, (to the same scales as the plan,) which shows the ventilators in the front and back walls, and the ridge and furrow roofs. The span of the pediments is 6 feet from centre to centre, and the rise forms an angle of 22½° with the plating. The front ventilators are 2 feet 3 inches, by 1 foot 3 inches in the clear, and are balanced on centres, on the pivot and socket principle. The openings communicating with the ventilators in the back wall, are 2 feet 9 inches long, by 1 foot in height.

Fig. 3 is a transverse section of the house, in which are shown the tanks, pipes, pathway, pits, and the vacuity for ventilation, in the back wall.

The front wall is 3 feet high to the top of the plating; and the angle of the rafters is 32° to the plating.

The platings are 6 by 3 inches bevelled; the rafters 5½ by 3 inches; and the bars 1¼ inches deep,—the whole filled in with sheet glass.

The manner of constructing the ventilators in the back wall is as follows:—In each bay of the roof there is a ventilator, raking at the top parallel to the pediments, and about 2 feet 9 inches width, and 3 feet in height. These ventilators, or openings, inside communicate with the vacuity in the back wall, (shown in the section,) and the air passes out through the openings shown in the front elevation. The ventilators or shutters inside are made to slide up and down in a wooden frame fixed to the wall, and are balanced by a line, pulley, and leaden weight, so that they will rest at any point required. Where neatness is desired, the ventilators may be trellised with fillets of wood; and a wooden trellis is fixed to the back wall, to which the stems of the plants are trained.

The house is heated on the tank system, by one of Burbidge and Healey's ribbed boilers, and 4-inch flange pipes. It will be seen by the section, that the tank at the back part of the house is on a higher level than that in front; this is in order that the flow pipes from the top of the boiler may descend from the back tank, pass under the pathway, and proceed along the front tank as a return pipe to the boiler. The four pipes shown in front are the flow and return pipes, from and to the boiler.

Fig. 4 is a section of the tank, &c., on a scale of one-third of an inch to a foot. The water in the tank generally covers the pipe about an inch over its surface, leaving a small space between the surface and the tank cover.

NOTICE ON THE CULTURE OF THE POLYANTHUS.

The Polyanthus—*Primula elatior Polyantha.*—These plants are natives of Britain; the time when they were first brought under the florist's notice as objects worthy of culture, cannot be traced with any degree of certainty. The mode of culture is the same as that recommended for the Auricula. It may be as well, perhaps, to suggest the properties requisite to form a perfect specimen of this class. They consist in,—1st, A compact and well-grown plant; 2nd, Flower-stems 6 inches in height, round, erect, and sufficiently strong to support the truss of bloom; 3rd, truss large, round, and compact, consisting of seven or more pips; 4th, Foot-stalks of the flowers strong, elastic, and equally divided; 5th, The pips should measure 1 inch in diameter, be quite circular, smooth on the edges, and perfectly flat; 6th, Tube one-sixth the diameter of the pip, same colour as the eye, well-filled with anthers in a perfect state; 7th, The trumpet or edging round the tube, must be circular, and rise a little above the eye; 8th, Eye of a yellow or lemon colour, quite circular, measuring half-an-inch in diameter including the tube; 9th, Ground colour should be solid, dense and rich, and of the same width as the yellow round the tube, forming a band on the inner side (the outer should be clean on the edge); 10th, The lacing round the edge of the pip must be well-defined and smooth; 11th, The bar which divides the segments of corolla, should be whole, of even width, joining the lacing to the yellow eye; 12th, The yellow must be distinct, marking the same.

The following are a few good varieties for exhibition:—Collier's Princess Royal; Pearson's Alexander; Huffton's Lord Rancliffe and Squire Ray; Bullock's Lancet; Bernard's Formosa; Buck's George the Fourth; Crawshaw's Invincible; Nicholson's Bang Europe; Coxe's Prince Regent; Fletcher's Defiance; and Clegg's Lord John Russell. The same remarks apply equally to this class of flowers, as to the foregoing.

INSECTS INFESTING THE GENUS PRIMULA,

INCLUDING THE VARIOUS KINDS OF AURICULA, POLYANTHUS, AND PRIMROSE.

All the various species and varieties of Primula are subject to the attacks of slugs, earwigs, and caterpillars of various species of moths, which may be described as follows:—

Bride's-maid Moth (*Triphæna Pronuba*).—The wings of this moth are two inches and a quarter in expansion. *First pair* grey, deeply clouded with reddish-brown. *Second pair* yellow orange, with a broad black band near the yellow margin. This in most seasons is a very common insect. The caterpillar is a dull brownish green, marked with two rows of black spots down the back. The parent lays her eggs about the beginning of August, and the caterpillars commence their ravages just above the surface of the soil, feeding only in the night, and retiring beneath the earth in the day. In winter they become partially torpid, and may be found coiled up beneath the shelter of large stones, or under rubbish, but as the spring advances, they again commence their ravages, and towards the end of April are full fed; they then form a cocoon beneath the soil and become pupæ, and the following June the perfect moths emerge.

SILVER-GROUND MOTH (*Cidaria Implicaria*). This is quite a common insect, and attacks both the Auricula, Polyanthus, and Primrose. The caterpillars generally creep down into the heart of the plant they attack, and there forming a web, they reside and feed on the embryo leaves and flowers. They commence their depredations early in July, and continue feeding until September or October, when they become pupæ, and the perfect moths appear the following June. When full grown, the caterpillars measure rather more than half an inch in length, are of a brownish green colour, with a row of white spots on each side. The wings of the moth, when expanded, measure rather more than 1 inch. *First pair* dull white, with several small dark spots, and two very irregular dark bands.

PRIMROSE MOTH (*Graphiphora Festiva*). In some seasons this is a very plentiful moth; in others, scarcely any are to be met with. The wings measure, when expanded, rather more than an inch and a quarter. *First pair* pale brown, mixed with grey, and having four dark brown angular spots. *Second pair* pale grey, shining, with a faint dusky spot in the centre of each. The parent lays her eggs about the end of July, and the small caterpillars commence their depredations much after the manner of the genus *Triphæna*. On the approach of winter they bury themselves a sufficient depth to be secure from either the severity of the weather, or their natural enemies; and there they remain in a state of partial torpidity, until the following spring, when they again commence feeding, and are full fed by the end of May, or beginning of June; they then go into the pupa state, and the perfect moths appear in July. The caterpillars, when full grown, are about an inch long, of a dull greenish yellow colour, with a pale yellow line down the back, and a dark line on each side.

DARK TAWNY MOTH (*Xylophasia Rurea*). The caterpillar of this pretty moth is said to feed upon the Primrose, but we apprehend it chiefly confines its depredations to the wild places in the woods, as only one specimen, and that in the perfect state, has been met with by us. The usual time of appearance is in July. Of the habits and colour of the caterpillar we are unable to state anything satisfactory. The wings of the moth measure, when expanded, about an inch and a half. *First pair* pale grey, shaded with reddish brown, with a large dark brown spot on the upper edge; a line of small brown spots extends from the base to the inner margin of each wing, and another broken and irregular one of similar dots on the margin itself. *Second pair*, pale blackish brown, with a black marginal line, and a pale fringe.

DARK PORCELAIN MOTH (*Argyromiges Sylvella*). The little greenish white caterpillar so commonly found on the leaves of the Primrose and Polyanthus, forming its singular mines, is probably the *Argyromiges Sylvella*. It makes its excavations much after the manner of those on the rose, with this difference, however, that the path is not formed in so tortuous a manner, and is more confined to the mid rib of the leaf.

NOTICE OF THE INTRODUCTION OF LADY LARPENT'S LEADWORT —PLUMBAGO LARPENTÆ.

By Mr. Geo. Eyles.

On the 16th of October, 1846, Sir George Larpent received, at Roehampton, two cases of plants from China;* and in a letter from Mr. Smith respecting them, this plant was particularly spoken of, as being one of the most ornamental he had seen in China, and was very rare even at Shanghai, also that it was the only plant in England of the kind. From these circumstances a more than ordinary interest was awakened in its favour;

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* In our "Magazine of Botany," vol. xiv., t. 267, it is stated that seeds were sent from China to Sir George Larpent by Mr. Smith; but we now understand that *not seeds*, but living plants, were sent by that gentleman.

it was, however, very small, and, as might be expected, after five months' voyage, in a very delicate state. It was immediately potted in a 60-sized pot, filled with a compost of equal parts of loam and peat, with a small quantity of silver sand, and placed in the plant-stove, where it made little progress during the winter; as the spring advanced, fresh signs of life were apparent, and several shoots were sent up from the base of the old stem. I then repotted it, using the same compost as before, with the addition of a little rotten cow-dung, and placed it in the Orchid-house (the temperature of which ranged from 65° to 70° Fahrenheit), where it grew rapidly, which convinced me that a moist heat was favourable to its growth.

About the beginning of June, the plant began to show its flower-buds, and on the 15th of July I had the gratification of seeing the first flower open, (a description of which is fully given in your "Magazine of Botany," vol. xiv., t. 267). I considered it a very handsome species, and accordingly exhibited it at the Horticultural Society's Meeting at Chiswick, on the 17th of July, where it was awarded the Silver Banksian Medal, Dr. Lindley and Mr. Gordon being the judges; it had then only three flowers open. It received its final shift about the middle of August, from a 12 to a No. 4-sized pot, from which time it has been literally covered with flowers; and, from its close habit, forms a very handsome bush; it was much admired by all who saw it, up to the beginning of October, when we handed it over to Messrs. Knight and Perry.

FLORICULTURE.

By John Dickson.

Carnations and Picotees.—The present time being a busy one with all cultivators of the above-named favourite flowers, I am anxious to contribute my mite of information to the general stock of floricultural knowledge, more particularly as to the management of the Carnation tribe, which not only involves a greater share of interest at this season, but likewise tests the patience and perseverance of the admirers of these flowers. To those amateurs who purpose the exhibition of their plants at the ensuing shows I especially address myself, knowing full well the care and attention requisite to the production of good blooms. The observations I have thrown together on this subject are the result of long experience. Condensed to meet the views of the conductors of the "Magazine of Gardening and Botany," they may be relied on implicitly; as the whole of the practice given, has been put in requisition a hundred times, and I think I may venture to assert with more than usual success. I shall presume that the plants are all potted into their blooming pots, and placed on the stage, and the stakes properly arranged, in readiness to have an elongating shoot attached to them so soon as circumstances seem to render it desirable, and this point requires careful supervision, as the wind often does considerable damage where any neglect in this matter occurs. So much of the business being completed, I would next direct the attention of my amateur readers to the best means of increasing the *size* of their blooms. A good show flower should measure at least from two inches and a half to three inches in diameter, the latter size decidedly the more preferable. In order to effect this, some skill and much patience is necessary in removing the buds of many varieties. Should this operation be postponed beyond the proper time, it induces a weakness in the plant that prevents the remaining pods from becoming strong or healthy, and amateurs find too late they have thus lost the chance of being able to exhibit a bloom of an otherwise valuable variety. In offering instruction to others, I invariably reconsider what I wished to learn when I first became a cultivator of this race of plants; one item is strongly impressed on my memory, and that is the difficulty with which growers discover those varieties that will carry one pod, or two, or three, for exhibition. To remedy any evil of this kind among my readers, I will give the names of the plants that will carry the above numbers, believing that such information cannot but be acceptable to every tyro in the art of Carnation and Picotee cultivation.

Show Carnations that will carry only one blooming pod on a stem :—Martin's Splendid, Eason's Admiral Curzon, Eliott's Duke of Sutherland, Lightbody's Mr. Groom, Fletcher's Duke of Devonshire, Rainsforth's Game Boy, Colent's Brutus, Ely's Lord Milton, Gregory's King Alfred, Jaques' Georgiana, Puxley's Queen Victoria, Ely's Mongo and Prince de Nassau, Willmer's Mayo, Nix's Lady Chetwynd, Chadwick's Brilliant, Wilson's William IV., Wigg's Earl of Leicester, Simpson's Queen Victoria, Brown's Bishop of Gloucester, Ely's Lady Ely, Barringer's Apollo, Tomlyn's Brisius, Wilson's Haniel, Wood's Rosabella, Fletcher's Duchess of Devonshire.

Show Carnations that will carry two blooms on a stem for exhibition :—Hepworth's Hamlet, Smith's Duke of Wellington, Twitchet's Don John, Willmer's Conquering Hero, Sharpe's Defiance, Lodge's True Briton, Hale's Prince Albert, Cartwright's Rainbow, Ely's Duke of Bedford, Ely's Mrs. Brane, Ely's Hugo Meynell, Halfacre's Rainbow, Holmes' Count Pauline, Mansley's Robert Burns, Wood's William IV., Puxley's Solander, Jacques' Iris, Hughes' Napoleon, Brooks's Eliza, Brabbins's Squire Meynell, Ely's John Wright, Mansley's Beauty of Woodhouse, Taylor's Lord Byron, Pollard's First Rate, Bucknall's Ulysses, Ely's King of Scarlets, Puxley's Rising Sun, Willmer's Hero of Middlesex, Smith's Marquis of Chandos, Copeland's Superb, Chadwick's Flora, Ely's Lady Gardener and Lovely Ann, Greasley's Village Maid, Lowe's Marchioness of Westminster.

Show Carnations that will carry three blooms on a stem for exhibition :—Colent's Julia, Davidson's Vanqueur, Barnard's Duke of Roxburgh, Puxley's Prince Albert, Young's Earl Grey, Hale's Lady of the Lake, Sealy's Princess Royal, Addenbrooke's Lydia, Brooks's Flora's Garland, Puxley's Lady Alice Peel, Puxley's Princess Royal and Queen of Roses.

Show Picotees that will carry only one bloom on a stem for exhibition :—Barnard's Cornelius, Brooks's Duchess of Cambridge, Dickson's M'Irshaw, Sharpe's Red Rover, Mathew's Ne plus ultra, Sharpe's Countess de Grey, Tolworthy's Isabella, Brinklow's Conductor, Burroughs's Lady Douro, Ely's Mrs. Lilly, Mitchell's Nulli secundus, Sharpe's Joinville, Brinklow's Lady Chesterfield, Burroughs's Duke of Newcastle, Headly's King James, Cox's Victoria Regina, Mrs. Barnard John's Prince Albert, Kirtland's Queen Victoria, Mathew's Enchantress, Sharpe's l'Elégant, Arvel's Princess Alice, Willmer's Princess Royal, Irshar's Matilda, Wilson's Miss Fanny Irby, Barraud's Bride, Burroughs's Lady Alice Peel, Dickson's Mrs. Irshar, and Garratt's Lady Dacre.

Show Picotees that will carry two blooms on a stem for exhibition :—Dickson's Charles Stanford, Wildman's Isabella, Burroughs's Mrs. Bevan, Cook's President, Dickson's Lady Jane Grey, Burroughs's Emma, Edmonds' Jenny Lind, Sharpe's Gem, Burroughs's President, Ely's Favourite, Green's Queen, Sharpe's Agitator, Willmer's Prince Royal, Burroughs's Miss Jane, Robinson's Nottingham Hero, Willmer's Elizabeth, Dickson's Sophia, and Syke's Eliza.

Show Picotees that will carry three or more blooms on a stem for exhibition :—Waine's Victoria, Irshar's Rosalind, Gedden's Sir R. Peel, Gedden's Masterpiece, Sharpe's Duke of Wellington, and several others. It is requisite, to bloom some of these latter varieties in perfection, to take off the master pod, which decreases the others in size, and induces their expansion more truly, and in greater perfection. Brilliancy of colour in the Carnation and Picotee is another point of excellence to which it is desirable to direct the attention of amateurs. To facilitate this, I recommend a weak solution of sheep manure in water, to be given them once or twice a week during the period the pods are swelling. Should this solution be judiciously applied, it will be found highly beneficial both as regards the size and beauty of the flowers.

The manner of preparing this manure water is briefly as follows :—Have a sufficient quantity of water to irrigate your plants once made boiling hot, previously ordering a tub to be prepared, with due regard to the quantity of water before alluded to; place therein one-third of sheep manure in a fresh state, then pour the boiling water on it till the tub becomes filled; stir it up from the bottom with a stick for two or three minutes, when it must be covered over with a cloth to prevent the steam from escaping; in about two hours it may be strained through a fine sieve, when it is ready for use. To every three gallons of pure water add one quart of the above mixture.

Parties desirous of increasing their choice varieties may now commence piping; the sooner this is done the better, the pipings will strike the best when planted on gentle bottom heat, and kept in a shady situation. A good compost to strike them in is one-third rotten turves or vegetable mould, one-third rotted horse-manure, and one-third road scrapings: this mixture should be passed through a fine sieve, and well incorporated previous to using. After it is properly prepared, place a layer about four inches in thickness over the bed you intend to plant them in, and make it quite even on the surface. The glasses in use for this purpose are of octagonal shape, and measure ten inches in diameter, five inches deep at the sides, and raised at the top two inches. In taking off the pipings from the parent plant, be careful not to strip the main stem, nor over prune them, as it generally proves injurious; young shoots of slender growth are the easiest to strike, they should be prepared by taking the two side leaves of the piping off at the third joint from the top, and putting the stem through horizontally just below it; shorten the two leaves above it, and the piping is complete. Previous to planting, just sprinkle some silver sand over the bed, then make an impression with the glass, that you may know the distances to plant them; then have a garden pan filled with water, place it close at hand that each variety may be immersed; before planting take each piping between your finger and thumb, and run it into the soil three quarters of an inch deep; the distance between each piping should be about half an inch; press them down rather heavily, and the operation is complete.

These directions will be found amply sufficient to ensure success in the cultivation of Carnations and Picotees; but should there be any inquiries instituted upon minor points, I shall be happy to enter upon those matters that are rather interesting individually than collectively.

MISCELLANEOUS.

New and rare Plants in Flower. The Horticultural Society's first exhibition, &c.

Amid the gorgeous assemblage of "Flowers of all hue" which adorned the exhibition stages of the Horticultural Society's first grand show for the current year, notwithstanding it is difficult to particularise a selection of noticeable subjects from amongst a multitude so universally, so preeminently good, we nevertheless cannot refrain from recording a few, but will precede our notices with some general remarks on the exhibition collectively.

Excellent as were all the general arrangements connected with the exhibition; admirable as was the cultivation displayed, and disposition of the collections in detail—still, the absence of *novelty* was universally commented on by the frequenters of the Chiswick May shows.

But one opinion, that of their super-excellence, could be entertained respecting the *Azaleas;* for, notwithstanding the intrinsically rich variety displayed amongst the *Orchids,* the Indian Azaleas, in the estimation of everybody, triumphantly bore off the palm—presenting such a brilliant array of gorgeous florescence, excellent growth, and noble specimens, as has on no previous occasion been surpassed, if scarcely equalled; and this, too, in spite of the unpropitious weather that plant cultivators had to contend with.

The different collections of *Orchidaceous plants* were exhibited in fine condition, and as the already fine specimens in the possession of those who grow this interesting tribe extensively, increase in dimensions, it is not unreasonable to expect the production of "spikes" and "scapes" of corresponding quality, and more especially if *quantity* be sacrificed to *quality* a little more in Orchids; a practice found to be so beneficial in the treatment of the majority of flowering plants.

Heath growers have evidently got into the right track in the management of this elegant tribe; an evident improvement being visible over former exhibitions in dispensing with artificial props to a greater extent. The generality of them were compact and handsomely grown shrub-like plants, the happy result of timely and judicious "stopping," which, in the beautiful specimens exhibited on this occasion, had manifestly been methodically attended to from the time they left the propagating house.

Stove and Greenhouse plants were exhibited in great numbers: the collections severally containing superb specimens of cultivation, indicating that the utmost care and most masterly style of management had been bestowed upon them.

It would be invidious to distinguish where excellence was so generally apparent, but in Mrs. Lawrence's collection especially, there were some gigantic subjects of culture, and if a fault was detectible in this costly group, it was one over which art and skill (having done all that apparently could be done) had no control, namely, owing to the long continuance of dull weather, many of the plants were not so perfectly blown as they doubtless otherwise would have been.

The *Pot-roses* justly excited the admiration and agreeable surprise of all beholders, and, considering the adverse season in which they thus early attained to such a high degree of perfection, their successful management reflects the highest meed of praise on their cultivators.

In the short period that has elapsed since the happy idea of growing roses in pots occurred, their cultivation in this attractive way has arrived at a higher degree of excellence than the most sanguine admirer of the "Queen of flowers" could have possibly anticipated; but superlatively beautiful as were the Hybrid perpetuals and other roses, there was yet a specimen of the yellow Banksian rose in a pot, which seemed to outvie the rest, and arrest the particular attention of every visitor. This variety we have frequently known to be discarded from collections of climbing roses on account of its supposed shy-blooming tendency, but in this instance was to be seen the somewhat magical transformation of a yellow Banksian rose from the climbing propensity to a symmetrical bush, literally clothed with clusters of transparent yellow blossoms.

Referring to *Pelargoniums*, we must not omit to notice the class called French or fancy sorts. Mr. Gains exhibited a collection of these, which, in point of cultivation, were the most perfect specimens we ever beheld, being nearly a yard in diameter, and yet not more than a foot or fifteen inches in height, and covered with a profusion of gay flowers. Their appearance deservedly induced the encomiastic remarks of every admirer of the popular family to which they belong. From their dwarfish, compact habit, and the profusion with which they bloom, these fancy kinds seem admirably adapted for flower garden display in summer.

New or very rare plants were very scarce at this exhibition, and but few of those brought there, possess much claim to specific notice.

Rhododendron campanulatum superbum. This beautiful hybrid was produced by Mr. Jackson of the Kingston Nursery, Surrey, and, being hardy, will prove a valuable acquisition to the American garden. It is a noble trusser, the foliage good, and slightly ferrugineous beneath. The individual florets are expansive, of a transparent, waxy white colour; the upper portion of the corolla being distinctly studded with rich crimson, and the throat spotted with numerous dark-brown spots. It was the opinion of Doctor Lindley, however, that this seedling is more allied to Rhododendron ponticum than to the bell-flowered rose-bays.

Rhododendron Marie Taglioni. This seedling, exhibited by Mr. Gains of Battersea, will doubtless prove, under good cultivation, an interesting addition to the hardy list, from having compact trusses of white flowers, extensively dotted with black spots, rendering it more curious than beautiful. We also noticed several hardy hybrid Rhododendrons from Messrs. Rollisson of Tooting, the best of which appeared to be *R. Grisewoodiana*, a fine trusser, with delicate florescence, richly marked with purplish crimson, and having ferrugineous leaves.

Calceolaria grandis. This Peruvian shrub, another of the numerous introductions of Messrs. Veitch of Exeter, was decidedly the most interesting novelty at the Horticultural Society's meeting. The habit is perfectly shrubby, and had the specimen exhibited been divested of its inflorescence, it would most easily have been mistaken for a fuchsia, instead of a fruticose slipperwort—the semi-herbaceous habit of throwing up its numerous woody stems in conjunction with its opposite branchlets and leaves, fully warranting the assumption in the absence of flowers. It appears to be a most abundant bloomer; the flowers which are produced terminally on the laterals, are transparent yellow, but too closely resemble the gaping development of the old *Calceolaria bicolor*, to be regarded as intrinsically beautiful. It will, doubtless, prove a most useful adjunct to the list of flower garden decorative plants, as well as a good greenhouse bush. It was introduced by Messrs. Veitch, through their own collectors, from Peru.

Viola lutea. This single-flowering, bright yellow violet is quite hardy, and although a pretty thing enough, it possesses no remarkable attractions. It may, however, prove a valuable agent for hybridisation with other varieties, and thereby produce some deserving novelties.

The flowers are clear yellow, conspicuously erected by long peduncles above the foliage, and, being hardy, will be found a very useful spring flowering plant for the flower garden, or, if grown in pots, for the decoration of the sitting-room vase. Introduced from Patagonia by the Messrs. Veitch.

Æschynanthus speciosus. A large specimen, of straggling growth, of this fine stove plant was shown by Messrs. Veitch, bearing numerous fascicles of beautiful orange-scarlet flowers. Like the majority of Gesneraceous plants, of which few approximate this in general beauty, it is not difficult to cultivate—requiring the same treatment as other soft-wooded stove plants.

Anguria Makoyana. A curious-looking cucurbitaceous plant, with leaves like a cucumber and red flowers on long peduncles, but of no great beauty, was exhibited as a new plant by Messrs. Rollisson, of Tooting. Also, from the same establishment, *Talauma mutabilis*, a pale yellow flowered Magnoliad.

Boronia tetrandra. A variety of neat compact habit, with foliage resembling, but not so long as, *B. pinnata*, and *lilacine* flowers abundantly, produced from the axillæ of the leaves. Although not on a par with some other members of the beautiful genus *Boronia*, it will doubtless prove a good exhibition plant, when grown to full specimen size.

It was exhibited by Mr. E. Henderson, of the Wellington-road Nursery.

Boronia spathulata. A new semi-frutescent plant, with pale pink flowers, and apparently an abundant bloomer.

It may be considered a pretty addition to the family, and although not prepossessing enough to be deemed first rate, we think it will ultimately prove to be a very useful specimen plant.

Exhibited from the collection of Messrs. Veitch.

Lithospermum. An interesting white-flowering species, with myrtle-like foliage, said to be quite new, was exhibited at Chiswick from the collection of H. Collyer, Esq., Dartford.

It was blooming profusely, in which state it is said to have been for two months previous to the exhibition. Being a greenhouse shrub of easy culture, it is not unreasonable to expect that it will turn out a useful adjunct to May exhibition plants.

Indigofera decora. One of Mr. Fortune's beautiful introductions from China, generally treated as a greenhouse plant, but said to be quite hardy. A most graceful plant was shown by Mr. Iveson, from the gardens of the Duchess Dowager of Northumberland. The specimen was beautifully grown, and closely furnished with large pendulous racemes of delicate pink or light lilac florescence.

Hoya. A species with thick, large, handsome foliage, and rather small brown or chocolate-coloured flowers, obtained from Java; was brought to the Chiswick Meeting on the 5th of May, from Messrs. Rollisson's collection.

Out of the numerous collections and specimen plants assembled at the Horticultural Society's Meeting, we also select the following as being worthy of especial notice.

Vanda suavis. A noble specimen, bearing two superb, weighty spikes of spotted purplish-white flowers, from S. Rucker, Esq.'s collection. Messrs. Veitch also had a remarkably fine plant of this fine Orchid, with a similar number of spikes, but not quite so good as Mr. Mylam's.

Dendrobium nobile. A splendid plant, three feet high, and as much through, with a score or more spikes of its surpassingly lovely florescence, which, contrasted with the lively verdure of its stems and foliage, induces it still to be regarded (notwithstanding all novelties) as one of the richest Orchids in cultivation. The specimen now alluded to was in vigorous health, and included in the fine collection of Mr. Williams, gardener to C. Warner, Esq., Hoddesden, Hertfordshire.

Mr. Warner's collection also contained a beautiful specimen of *Lycaste cruenta,* forming a rich mass of nearly forty deliciously-fragrant auriferous blossoms.

Dendrobium moniliforme. A fine plant of this splendid Epiphyte, with more than thirty spikes of its rosy, crimson-marked flowers, was exhibited with the above.

D. cærulescens. An immense mass of stems and floral-spikes, a yard through and four feet high. The general appearance of this species so much resembles *Dendrobium nobile* that at first sight we mistook it for the latter. The principal distinction, however, resides in the flowers, for, on close inspection, the labellum of *D. cærulescens* will be found less pubescent in the interior, and the colour of the sepals and petals assimilating more to a *bluish* purple than *D. nobile;* neither is the verdure of the flower-stems so deep as in the latter. This fine specimen was also among Mr. Williams's plants.

Phaius Wallichii. This luxuriant Orchid, also included in the above collection, exhibited six good spikes of its rich-coloured flowers. Belonging to the terrestrial division of the tribe, this fine specimen had attained a considerable height, presenting a noble palm-like appearance compared with the generality of Orchidaceous plants.

Zygopetalum rostratum. This, although an old plant, was an excellent specimen, with a scape having a score or more of its greenish-brown, white-lipped flowers expanded. Exhibited by Mr. Williams.

Dendrobium densiflorum. A specimen, in fine condition, of this beautiful species, with sixteen or eighteen large pendulous bunches of rich orange-yellow florescence, was included in the collection of S. Rucker, Esq. We seldom see this showy species bloomed so well as it ought to be, which is probably owing to its not receiving a proportionate amount of rest in the dormant season.

Cattleya Skinneri. A superb plant of this richly-delicate species, with eight or nine spikes of rosy-purple flowers, was also included in Mr. Mylam's group. The newly expanding blossoms of this fine Orchid, from being of a more pallid hue, form a pleasing contrast with the richer brilliancy of those that are fully developed.

Leptotes bicolor. A dwarf mass of white, rosy-purple-lipped flowers, forming an interesting specimen of good cultivation. Exhibited by Mr. Mylam.

Chysis bractescens. A strong plant of this fine Mexican species, with four spikes of large pure white flowers, having yellow centres, was also among Mr. Mylam's plants.

Epidendrum tabicinum, with a large spike on a stalk nearly two yards in length.

Also a rare plant of

Galeandra Devoniana, exhibiting amongst the elegant, half-drooping foliage, perpendicular racemes of lovely trumpet-shaped white flowers, the large labellums elegantly streaked with ruddy chocolate.

Also the singular

Oncidium phymatochilum, displaying a branched flower-spike four feet high, bearing *Brassia*-like flowers with yellow labellums.

Mr. Mylam's collection also contained a remarkably fine plant of

Phalænopsis grandiflora, with seven or eight spikes, two of which were exhibiting their exquisite flowers.

In addition to their noble *Vanda suavis* noticed above, Messrs. Veitch, of Exeter, had

Dendrobium macrophyllum, with seventeen or eighteen drooping spikes of its strangely-scented, pinkish purple prominent-veined flowers, with rich reddish-purple lips. Also the yellow-lipped

D. tortilis, well-bloomed, and in fine condition. Also

Cypripedium barbatum, a beautiful specimen, with numerous greenish-white purple-streaked flowers, forming a pleasing contrast with its prettily-mottled foliage, and good specimens of *Dendrobium Nobile, Cattleya Skinneri, Phalænopsis amabile, Dendrobium aduncum, &c.*

In the collection of W. Farmer, Esq., we noticed a good

Cattleya Skinneri, with eight spikes of glowing florescence.

Acineta Humboldti, with five drooping spikes of chocolate-spotted flowers, several of which were fully expanded.

Burlingtonia fragrans. A fine specimen of this rare and highly fragrant species was exhibited with the above, with a flower spike having upon it half a score of its delicate yellow and white flowers. Also

Arpophyllum giganteum, a very interesting plant, with a perpendicular spike of minute, waxy, purplish-crimson flowers.

Trichopilia tortilis. A superb mass of this beautiful, but extremely curious Mexican orchid, composed of more than forty of its handsome white and deep crimson flowers, forming a globular mass of inflorescence nearly twelve inches in diameter, was exhibited in the group of J. Schroeder, Esq., Stratford, which also contained a good

Cattleya Skinneri, with seven spikes.

Vanda cristata. A fine specimen, with deeply channelled foliage, and large, whitish, mottled and dark-brown striped flowers protruding solitarily on long peduncles. In the same exhibition was a well-managed plant of

Oncidium ampliatum major.

Calanthe veratrifolia. A good plant, exquisitely bloomed.

Oncidium stramineum. A neat, well-bloomed specimen of this pretty species was exhibited by Mr. Beck, of Isleworth, who also had that fine epiphyte,

Saccolabium guttatum, exhibiting a couple of racemes of its white, rose-spotted and rosy purple-lipped flowers, and a fine specimen, in capital condition, of

Epidendrum crassifolium.

Dendrobium fimbriatum. A good plant of this old orchid, exhibiting more than thirty pendulous racemes of its rich yellow, fringed florescence, which, contrasted with the dark-green foliage, composed an object of singular grace and beauty, was shown at the Chiswick meeting by Mr. Bruce, gardener to B. Miller, Esq.

Dendrobium Wallichianum. A first-rate specimen, full of flowers of this capital orchid, was exhibited from the Duchess Dowager of Northumberland's collection, by Mr. Iveson.

Erica Cavendishii. An immense plant, of pyramidical growth, of this magnificent heath, composed from the base to the apex of robust perpendicular branches and stiff laterals profusely clad with bright yellow florescence, was exhibited as a superior specimen of cultivation, at Chiswick, by Messrs. Fairburn, of Clapham Nursery.

Pimelea spectabilis. Admirable specimens of culture of this most beautiful of *Pimeleas* were numerous at the Chiswick meeting; but the grand plant, exhibited by Mr. May, gardener to Mrs. Lawrence, Ealing Park, far outshone them all both in size and display of flowers. It was at least six feet in diameter.

Gompholobium polymorphum. A good specimen of this beautiful but rarely well-managed leguminous plant, trained over a broad shield-like trellis, was exhibited by Mr. Campbell, gardener to C. Huggins, Esq., Norwood.

Ixora coccinea. A gorgeous specimen of this fine stove-plant, in first-rate condition, forming a rich combination of foliage and scarlet-crimson flower-heads, was exhibited from the collection of J. Coster, Esq., Streatham.

Nemophila maculata. A nice-trained plant of this showy Californian annual, with numerous white flowers having bluish-purple blotches at their central margins, we noticed in a pot in the large conservatory at Chiswick. Although quite hardy, and adapted for flower-garden decoration, it is nevertheless an ornamental spring plant for the greenhouse or conservatory, when trained over a shield-like or globular wire trellis in the manner we noticed at Chiswick. Some of the individual flowers upon the plant alluded to were as large as a crown-piece.

Rondeletia. A new erect-growing species, with large shining Ixora-like foliage and corymbose heads of pink and white flowers, was exhibited at the Horticultural Society's Rooms in Regent Street, by Mr. Smith, gardener to Mr. Anderson, Regent's Park. Mr. Smith said he had accidentally discovered it in soil adhering to a South American importation of *Orchids,* with which it had apparently been introduced and then germinated. Being quite shrubby, and by no means tender, it may ultimately prove a useful greenhouse plant when well cultivated.

Cyclamen Persicum. Although as "old as the hills," we cannot refrain from noticing the most remarkable specimen we ever beheld, which was also present at the last meeting of the Horticultural Society in Regent Street. It was growing in fertile soil in a large pot, and composed a deliciously-fragrant mass of white florescence and dark foliage full eighteen inches in diameter, the produce of an individual bulb. The specimen was forwarded to the Meeting Rooms by Mr. Myatt, Deptford, and sufficiently exemplified what gratifying results an extensive rooting medium, in conjunction with good cultivation, will secure.

Coleonema pulchra. This elegant greenhouse plant is not so extensively diffused as it deserves to be, or if not uncommonly met with in collections, it is rarely seen otherwise than a neglected specimen.

It is, however, deserving of a better fate and more extensive patronage, as those who require ocular demonstration to convince them, may perceive by a visit to Messrs. Henderson's, Pine Apple Place.

In their nursery we recently saw a fine specimen three or four feet in height, and four or more feet through, composed of long slender plume-like branches, exhibiting all the grace of the giant feather grass, with the additional beauty of a profusion of small Boronia-like flowers of a pinkish hue clothing their extremities. To cultivate it well, abundance of pot room must be afforded it, as the roots are numerous; and during the formation of the specimen frequent "stopping" must be resorted to, as the growth of the young shoots is rapid.

The observations we have above made in reference to the Chiswick exhibition in the aggregate are generally applicable to the first meeting of the Royal Botanic Society, held on the 16th May, so that it will be unnecessary to repeat them here.

Many of the superb collections and remarkable "specimens" brought together on the former occasion, were reproduced here, we thought in finer

"Show" condition, a result which was of course anticipated from the additional amount of solar influence they had experienced since adorning the tents of Chiswick.

There was a similar striking absence of novelty, and new plants were individually as scarce at the Regent's Park meeting as at that of the Horticultural Society.

Mitraria coccinea. A good specimen of this hardy evergreen shrub was exhibited in a pot at the Royal Botanic Society's Meeting, by Messrs. Veitch. It is a highly ornamental plant, perfectly shrubby, and if quite hardy, as Messrs. Veitch believe it to be, will be found a neat and interesting specimen for the Arboretum, or Shrubbery foreground. It is well worthy of pot-cultivation also; its vivid orange-scarlet blossoms, which are freely produced on the young wood, presenting a pleasing contrast with the neat sub-Fuchsia-like, evergreen foliage, from the axillæ of which they gracefully depend on long filament-like peduncles. It is a Patagonian plant, and was introduced from the island of Chiloe, by Messrs. Veitch, of Exeter.

Rhododendron azaleoides Leeanum. A large specimen in a tub, furnished with about twenty good trusses of rather fragrant pale yellow flowers, the upper portion of the corolla distinctly marked with bright orange-colour, was exhibited at the Royal Botanic Society's Meeting. Rhododendrons in this way are rather scarce, and the subject of our notice will prove an attractive addition to collections. It was from the nursery of Messrs. Lee, Hammersmith.

Rhododendron aureum. A good variety, with yellow flower heads, the upper petals of an auriferous hue, and spotted with greenish orange. Exhibited by Mr. Gains, of Battersea, at the Regent's Park Meeting.

Pimelea Hendersonii. This fine specimen, a yard through, and as much in height, was blooming profusely at the Regent's Park exhibition on the 16th May. It is a robust grower, and the rich rosy-pink flowers, when fully developed in profusion over a large plant, exhibit a specimen of great ornamental efficacy. From Messrs. Henderson's Nursery establishment, Pine-apple Place.

Gardenia Stanleyana. An umbrageous *tree* of this fine stove evergreen, bearing a profusion of its highly-fragrant trumpet flowers, was brought to the Botanic Society's Meeting from the Dowager Duchess of Northumberland's collection at Sion House. It was growing in a pot, but the best situation for this noble Gardenia to display itself to advantage is in the border of a stove conservatory, where, with ample space for its numerous roots to extend, and its branches unencroached upon by their neighbours, it will soon attain the umbrageous habit of a low tree, and display hundreds of its rather curious tubular flowers with all the freedom, and less of the unsightliness of a tree-Brugmansia, which, when contrasted with the handsome, shining foliage, would produce one of the finest ornaments the warm conservatory could boast of.

Gardenia Fortuniana. One of the most attractive specimens brought to the above meeting was this beautiful variety of G. florida. It was altogether a luxuriant plant, and exhibited about a dozen flowers as large, and not unlike a double White Camellia when fully blown, but with the additional charm of fragrance the most delicious. The flowers were full four inches in diameter, and in going off, change from pure white to light buff colour, forming a pleasant contrast with the deep verdure of the fine broad leaves. Exhibited by Mr. Green, gardener to Sir E. Antrobus, Bart., Cheam.

Toasted Grains of India. These grains are eaten by the natives in Scinde, and, indeed, in India generally. They are very useful for journeys, and are prepared on hot sand in an iron vessel; some—as Jawar (*Sorghum vulgare*), and Muhaiee (*Zea Mays*), which swell, and become light and white—are called *Phulla,* i. e., "*Swell-ies.* Some, as Chaur (Rice), are also called *Phulla*; but these do not turn light and white. Wheat and grain are merely burnt and toasted, and not changed in look. Grain (*Cicer arietinum,* lentils) is further rolled in powdered sugar-candy, and becomes a kind of comfit. Grain-flour is made up with sesamum oil into a mass, which, rolled in sugar-candy, forms a kind of sweetmeat.

Culture of Ferns. By Mr. Thomas Moore. Ferns do not, in a general way, under cultivation, associate with other plants. Orchids, however, are an exception; the degree of humidity kept up, and the shade afforded, in the case of Orchid-houses, being favourable to their growth. Low buildings are preferable; and if they face the north, the plants can receive more light, without the danger of the sun's rays. Of atmospheric moisture these plants need an abundant and almost unvarying supply; even in winter this is necessary for those in a growing state. Deciduous kinds are the better for being kept somewhat drier, from the time the fronds decay until they again renew their growth. Shading should be used in bright sunny weather, during the whole of the summer season. The propagation of Ferns is effected by division and spores; those species which creep horizontally and form underground stems, throwing up fronds at intervals, may be increased by dividing the caudex with a portion of the roots and fronds; and the same method can be adopted with those which do not creep, although the opportunities of doing so are less frequent than in plants of the first character. The separated plants should be fixed firmly in small pots, the crown being just clear of the surface of the soil; and, after being gently sprinkled with water, they should be placed in a situation where the atmosphere is rather closer than is required for established plants, until they have begun to grow. The smaller and more delicate kinds are greatly benefited by being covered for awhile with bell-glasses. Propagation is also effected by spores. Half-fill some shallow, wide-mouthed pots with broken crocks, and on this put a layer of about two inches of little lumps of spongy peat soil, mixed with soft sandstone, broken in small lumps of the sizes of Nuts or Peas. This compost should not be consolidated. Next, shake a brush very gently over a sheet of white paper, or frond of the species to be propagated; the fine brown dust thus liberated is to be regularly and thinly scattered over the rough surface of the soil, which must be immediately covered with a bell-glass large enough to fit down close within the pot rim. The pots should be at once set in feeders kept constantly filled with water, and placed either in frames or in the fern-house, according to the kinds sown. It is never advisable to water the surface of the soil after the spores are sown; and it is well to roast the soil employed, in order to kill the germs of any other plants that may be contained in it. For soil, a good general compost may be formed of equal parts of fibrous heath-soil, broken up into lumps as large as Walnuts (or smaller for small pots), and perfectly decayed leaf-mould, with a portion of clean gritty sand, especially for potting the more delicate kinds; the more robust growers are benefited by a small portion of light loam being added to the above compost. In potting, good drainage is essential, and the crown of each plant should stand about level with the pot rim. The temperature which the tropical species require is about 70° in the growing season, decreased to 60° in winter, and lowered at night to 55° or 50°. The species which are natives of temperate climates require a day temperature, ranging from 40° to 60°; permanently lower in winter than in summer, and, in all cases, lower by night than by day; from 35° to 40° will be a sufficient night temperature. The hardy and half-hardy species may be placed in a frame kept moderately close at all times, and, in winter, covered at night with mats. The hardy species do not absolutely need this protection, but the shelter thus afforded is favourable to their development. Shade, during bright sunny weather, is decidedly advantageous to these plants. Ferns should never be suffered to become dry; when growing, they require a free supply of water at the roots, and frequent sprinkling overhead; but when at rest, a moderate quantity is sufficient. Soft water should always be used.—*Jour. Hort. Soc.*, iv. 90.

The Moss Rose. The history of the Moss Rose is wrapped in obscurity. It was first introduced to England from Holland; and it is generally believed that it was a sport from the Provence Rose; that it was not originated by seed, as most new varieties are, but by a branch of the Provence Rose sporting, as it is termed,—that is, producing flowers differing in character and habit from others of its own nature,—flowers enveloped in moss. Some tribes of plants are more disposed to sport than others; and the Provence and Moss Roses possess this peculiar property to a remarkable degree. I have seen the White Moss bearing at the same time, and on the same plant, red, white, and variegated flowers. I have also seen the Perpetual Moss, whose flowers should be white, produce pink flowers, entirely destitute of moss. I am informed, and think it probable, that the Moss Unique was first obtained in this manner. A branch of the White Provence Rose produced flowers enveloped in moss; the branch was propagated from, and the plants so propagated produced flowers retaining their mossy characteristic.

Like many others, the group now before us has been much improved of late years: many of the old varieties, formerly so much esteemed, though possessed of but few petals, and almost destitute of form and fragrance, are now quietly departing to give place to more perfect kinds. A remarkable illustration of the effects of hybridising is met with here. There have been introduced lately some Moss Roses of the most vigorous growth, with shining foliage; and others bearing flowers in the autumn. The former have been produced by crossing the Moss with the Hybrid Chinese Roses, or *vice versâ*, the latter, by bringing together the Moss and Perpetual. Moss Roses require high cultivation; some are of delicate growth, and will only flourish in a kindly soil; others are very hardy; but all, whether hardy or delicate, delight in a rich soil. But few of the Moss Roses are well adapted for standards: it is true that many will exist as such, but they merely suffer existence; they cannot be said to flourish. The Moss should be grown either on their own roots, or budded on short stems (the latter is preferable in most cases), and should be closely pruned. Exceptions, however, may be made to this rule.

If we except the common Moss, we do not consider this group well suited either for pot-culture or for forcing. Their distinctness, however, stands forth prominently in their favour; and in large collections it is worth while to introduce a few, for the sake of variety. The flower-garden or the rosarium is their proper place; and we think a greater space should be allotted them there than is usually done. No Roses can be more interesting; certainly none are more beautiful. It is true they do not thrive well in all soils. I received a letter last year from a distinguished amateur, in which he says, "I will look at none but hardy Moss, for the majority do not thrive well here. The situation is eminently favourable for Roses, but the soil is rather cold and heavy." This unriddles the mystery. All the Moss Roses should be planted in a tolerably dry, warm, and rich soil, with an airy exposition, and the result is sure to be satisfactory. Where such is unattainable, the hardiest only should be cultivated, and these budded on the Dog Rose.

On such soils as I have just recommended, the varieties termed "vigorous" may be fashioned into "Pillar Roses," and they are indeed unique when cultivated in this manner. Some of our readers may perhaps doubt whether Moss Roses are suited for this purpose; and writers have too often spoken of them collectively, as being of dwarf and delicate growth. What will such say to a pillar formed with the old Red Moss reaching to the height of fifteen feet? That such a one exists I can confidently assert, for I measured the plant last autumn in company with the owner, who assured me he could have trained it higher, but that he was unable to obtain poles to support it. It cannot be said that the pillar is well furnished with branches the whole height; but I feel confident that many varieties will form handsome, well-furnished pillars six or eight feet high. Surely much more is not required. Ten feet is perhaps the maximum of height desirable even for a Pillar Rose. Beyond this, not only are the best flowers out of sight, but there is infinite trouble in protecting the plants from the wind, in pruning, &c.

If the reader should wish to see the plant alluded to above, it is in the garden of Mr. Anderson, of Bull's Cross, near Cheshunt, growing within a few feet of the road. When I inspected his Moss Roses last winter, some of the shoots of the previous year's growth were above six feet long, and extremely robust, and the main stems had swelled to a considerable size. The mossy calyces were still hanging on the tree, showing there had been an abundance of flowers. There were several other plants of the Moss Rose formed as pillars, two or three of which were nearly equal in height to the one above mentioned.

Now, to what circumstances is this uncommon case due? for uncommon I admit it to be. Is it owing to situation, soil, the age of the trees, or the fostering care of the cultivator? Partly, I should say, to all. The garden lies open to the sun; the situation is airy; the soil is a brownish loam, not exactly light, but friable, and containing a good share of vegetable matter; a soil in which Wall-flowers and Fuchsias vie with Roses in vigour. The ages of the largest Rose-trees are probably from twelve to twenty years.

Vegetation in Kamtschatka. The soil in the Bay of Awatscha consists everywhere of the richest vegetable mould: but, in spite of this advantage, agriculture is still in its infancy. The inhabitants live almost entirely on wild berries and fish, especially herrings and salmon. It is only around their houses that little patches, cultivated with potatoes, cabbage, radish, lettuce, and turnips are met with. The cabbage and turnips are excellent, but the potatoes are very watery, probably the soil is too rich.

All the plants collected in Awatscha Bay amount to one hundred and thirty; but I do not think there are many, if any, new species amongst them. There is, however, a considerable number different from those enumerated in the Botany of Beechy's Voyage, which certainly, considering they were gathered in such a hurry, leads to the conclusion that there still exist many unknown to us. But if the coast affords such riches, what must not the interior of the peninsula produce?

There is a striking difference between the vegetation of Awatscha Bay, and that of Kotzebue Sound. Trees no longer adorn the soil: all ligneous species are low and dwarfy. The *Betula incana* of Kamtschatka, there a noble tree, is here transformed into a low bush. The Salices have sought shelter on the slope of hills having a southern aspect, where also the greater part of the herbaceous vegetation abounds. There is nothing interesting in such a landscape, nothing to arrest the eye, nothing to interrupt the monotony of the scene; a grey peaty surface covers hill and dale. *Betula nana, Sedum palustre, Arctostaphylos alpina, Andromeda polifolia,* and *Vaccinium uliginosum,* hardly raise their heads above the surrounding lichens and mosses. The numerous little lakes and pools, peopled by flocks of wild geese, have their margins lined with beds of Carex and Eriophorum, while the sea-shore abounds in several Algæ, and heaps of drift wood. This drift wood, consisting of fir and beech, is probably carried down Buckland river, and must have grown far inland. Some of the largest stems of fir I measured, and found them forty feet long, and two feet in diameter.

The lagoons and mangrove swamps that surround the port of Mazatlare, the abominable smell they diffuse, and the unhealthiness they spread over the adjacent country, rendered the first five leagues of our journey very unpleasant, but when we reached more solid ground, all was well. The Tecomate of the Mexicans (*Crescentia alata, H. B. et K.*), was here very plentiful. It is a tree about thirty feet high, whose fruit, resembling very much an unripe orange, contains a pulp of a sourish bitter taste, which is boiled with sugar, and taken against complaints of the chest. All Crescentiæ, I am of opinion, are naturally littoral plants; for, although they are not so closely confined to the sea-coast as the Avicennias, and Rhizophoras, yet they are, like many other maritime plants, the *Hibiscus arboreus, Cocos nucifera,* and *Pithecolobium macrostachyum,* for instance, capable of growing, under cultivation, far inland, but do not spontaneously extend their range beyond the limits of the sea-breeze.—*Hook. Jour. of Bot.*, p. 145.

NEW AND BEAUTIFUL PLANTS FIGURED IN THE BOTANICAL PERIODICALS.

Callistemon brachyandrum. The seeds of this plant were sent from his Excellency, Captain Grey, to the Gardens of the Horticultural Society, and are said to have been collected on the north coast of Australia. The plant forms a stiff shrub, with the habit of other species of the genus, but with deep-green, narrow, pungent, channelled leaves, having conspicuous dots on the under side, and no veins. The spikes of flowers are loose, and not more than two inches long. The petals are dirty white, short, and inconspicuous. The stamens are deep rich crimson, not more than twice as long as the petals, and quite straight; the anthers are golden yellow, and contrast well with the crimson filaments. It is a small hardy greenhouse shrub, which grows freely in a mixture of sandy loam and peat. It is increased by cuttings of the young wood in the usual way, and flowers from August to November.—*Jour. Hort. Soc.*, iv. 112.

Cœlia macrostachya. Collected by Mr. Hartweg in Guatemala, where it has been found in a wild state, with a close flower-spike as much as a foot long, and its blossoms are reported to be deep red; but in cultivation it has hitherto gained no such size, and the colour is only a pale rose, without any brilliancy. It is best treated as the half-terrestrial kinds are, and grown in rather a shady part of the house; it requires but little moisture or heat, and a light, loose material to grow in. —*Jour. Hort. Soc.*, iv. 114.

Cereus reductus. *Dingy Cereus.* An old inhabitant of the Cactus-house of the Royal Gardens, Kew, originally received from Mexico. A very dingy-looking species except when in flower, when the pure white corollas, with a slightly pink tinge, have a pretty effect. —*Bot. Mag.*, 4443.

Cœlogyne fuliginosa. *Dark-flowered Cœlogyne.* A native of India, and imported in the year 1838. The racemes contain from three to five large flowers of a rich ochre-yellow, and a dark orange-brown lip. The plant should be kept in the warm part of the Orchid-house, and be attached to a block of wood suspended from the roof, giving it the same treatment as other Indian epiphytal Orchidaceæ.—*Bot. Mag.*, 4440.

Cyrtanthera catalpæfolia. *Catalpa-leaved Cyrtanthera.* This is a truly handsome and new plant, equally striking for its ample foliage and its fine thyrsi of full yellow flowers. It was sent from Honduras to Kew by Mrs. M'Donnel (the lady of the Governor), and flowers in the stove during the summer months. It constitutes one of the same genus of Acanthaceæ with Justicia.—*Bot. Mag.*, 4444.

Epidendrum gravidum. A mere botanical curiosity, collected by Mr. Hartweg in Xapatam, in Mexico. It has a scape nearly six inches in height, bearing at the end about four long-stalked, horizontal green flowers, which never open.—*Jour. Hort. Soc.*, iv. 114.

Limnanthes alba. A native of California, collected by Mr. Hartweg, and, like *L. rosea*, has the habit of *L. Douglasii*, but the flowers are white, not yellow or pink, and their stalks are very long. It is of interest in gardens chiefly for the decoration of heavy, damp places, where better flowers will not grow. In such situations all the species thrive and become ornamental, retaining their freshness and flowering incessantly through the whole summer. It may be a question whether they would not be useful salads, as they all possess the agreeable warmth of Tropæolums, without being quite so pungent.—*Jour. Hort. Soc.*, iv. 112.

Lycaste Skinneri. A native of Guatemala, and is remarkable no less for the large size of the blossoms, than for their chaste colouring, white spotted and suffused with rich rose and crimson. It is a ready flowerer, and the flowers remain a long time in great beauty. It is easy of cultivation, and thrives in the cool division of the Orchid-house, planted in turfy peat and sphagnum, in shallow pans full of holes, which are preferable to pots for this plant. It is propagated by division of the pseudo-bulbs.—*Bot. Mag.*, 4445.

Navarretia pubescens. A dwarf, branching, hairy plant, not more than six inches high. The flowers are small, greyish blue, and are produced in close heads. It is a hardy annual, requiring the same treatment as Gilias and Leptosiphons. It is rather showy when seen in masses.—*Jour. Hort. Soc.*, iv. 111.

Navarretia cotulæfolia. An annual, growing only two inches in height, a native of California, where it was discovered by Mr. Hartweg in fields about Sonoma, along with the last. This is another hardy kind, but from its very dwarf habit and small flowers it is more suitable for rock-work than the borders.—*Jour. Hort. Soc.*, iv. 112.

Pesomeria tetragona. *Square-stalked Pesomeria.* A very remarkable Orchideous plant, native of the Isle of Bourbon, introduced to our stoves by Messrs. Loddiges, but first detected and described, as an Epidendrum, by M. Aubert du Petit Thouars. The genus differs from Bletia in its four, not eight, pollen-masses. It is a terrestrial kind, and should be kept in the warm division of the Orchid-house, potted in turfy peat.—*Bot. Mag.*, 4442.

Polygonum Brunonis. This was raised from seeds received by the Horticultural Society in April, 1845, from Captain William Munro, who sent it from the northern parts of India. It is a dark-green-leaved trailing, half shrubby plant, with dwarf ascending stems, which bear spikes of rosy flowers, and is well suited for the decoration of rock-work.—*Jour. Hort. Soc.*, iv. 116.

Primula altaica. A scapeless species with beautiful orange-eyed purple flowers; it was discovered by C. J. Darbishire, Esq., who found it growing on grassy land, which had recently been cleared of the brushwood, in the neighbourhood of Karak, a quarantine station on the Asiatic side of the Bosphorus, near the mouth of the Black Sea. It is perfectly hardy, but flowering in very early spring it forms a great ornament in the greenhouse.—*Jour. Hort. Soc.*, iv.

Thyrsacanthus bracteolatus. A plant nearly related to Justicia. It inhabits New Grenada and the West Indian Islands, and was sent by Mr. Purdie from Jamaica. It requires tropical heat, and grows freely in any kind of light soil not retentive of water.—*Bot. Mag.*, 4441.

CALENDAR OF OPERATIONS FOR JUNE.

The weather being generally warm at this time, coverings may be quite removed, except from such plants as require shelter from the sun's rays, and considerable watering and syringing will be required both for newly-planted vegetables and flowers, as well as to prevent drought. Where much watering is used, the soil should be loosened to prevent its becoming hard on the surface. The gayest flowering plants, from the stores of the propagating house, should now be potted off to furnish the summer supply. Plunging should be resorted to with newly potted plants, but the plunging medium should be above the ground level.

Many of the popular beauties among the plants and flowers of this month, being of a somewhat ephemeral character, constant means must be used by the gardener to ensure a succession of gaiety until the frost sets in; when their displacement will be filled up by other plants.

FRUIT AND VEGETABLE DEPARTMENT.

Glass.

Pines, under high temperatures, will now require the most liberal watering; but the growing stock must have an abundance of air during the morning part of the day. The afternoon is the most proper time to encourage a vast amount of heat and atmospheric moisture. Both the succession stock and fruiters should be now in the height of their vigour; and manure-water may be used for the fruiters, provided they possess healthy roots; and the succession stock should be furnished with a gentle supply of air, both day and night if possible, to ensure success.

Vines, &c. The roots that are inside should be properly watered, if dry, with good manure-water at a temperature of from 80° to 90°. The disbudding and stopping of the very late houses should now have every attention. Give a great amount of air to the ripening fruit, and remove imperfect bunches. Vines, Figs, and Peaches, in pots, should be thoroughly watered; and Cherries in tubs, from which the crop is removed, should have abundance of air, and should be well supplied with liquid-manure. It may be unnecessary to add that aphides and red spiders should not be allowed to establish themselves in any of the forcing houses.

Peach Trees. The roots should be thoroughly examined as to moisture; and if in a mellow state embrace the opportunity of applying good liquid-manure to trees carrying heavy crops. Those beginning to ripen should have the lights thrown wide open to ensure flavour and high colour. Let the sun shine on the fruit by removing the leaves, which, with liberal ventilation, will impart a high colour, and give high flavour.

Fig Trees. Keep up the stopping process when the young wood is four or five eyes long, and water the plants very freely. This must be observed with respect to those plants that are under glass.

Cucumbers and Melons. The bottom heat should not be below 75 degrees.

Open Air.

The disbudding of fruit trees at this season should be attended to; and the present is a good time to get out the following crops:—

Kidney Beans. Sow full crops both of dwarfs and runners; if the weather proves dry, water the drills previous to sowing.

Endive. Sow for the principal crops, and plant out those sown last month, 12 inches apart.

Celery. Plant out in trenches.

Broccoli. Take advantage of dripping weather to plant out a moderate crop, 2½ feet apart; sow a little more seed, and prick out those sown last month.

Savoys. Plant out the main crop for autumn and winter 2 feet apart; if the weather be dry give them a good supply of water.

Turnips. Sow plentiful crops of the stone-top, &c., twice during the month, and hoe and thin those sown before.

In the out-door fruit department, summer pruning should commence towards the middle of the month.

Peaches, Nectarines, &c., will require all foreright and ill-placed shoots rubbing off, leaving however a good supply of young wood for bearing next year. Apricots will now require looking over, and where the fruit is much crowded in large clusters, thin it out sufficiently to allow room for swelling, and towards the end of the month peaches and nectarines will require a similar treatment.

FLOWER DEPARTMENT.

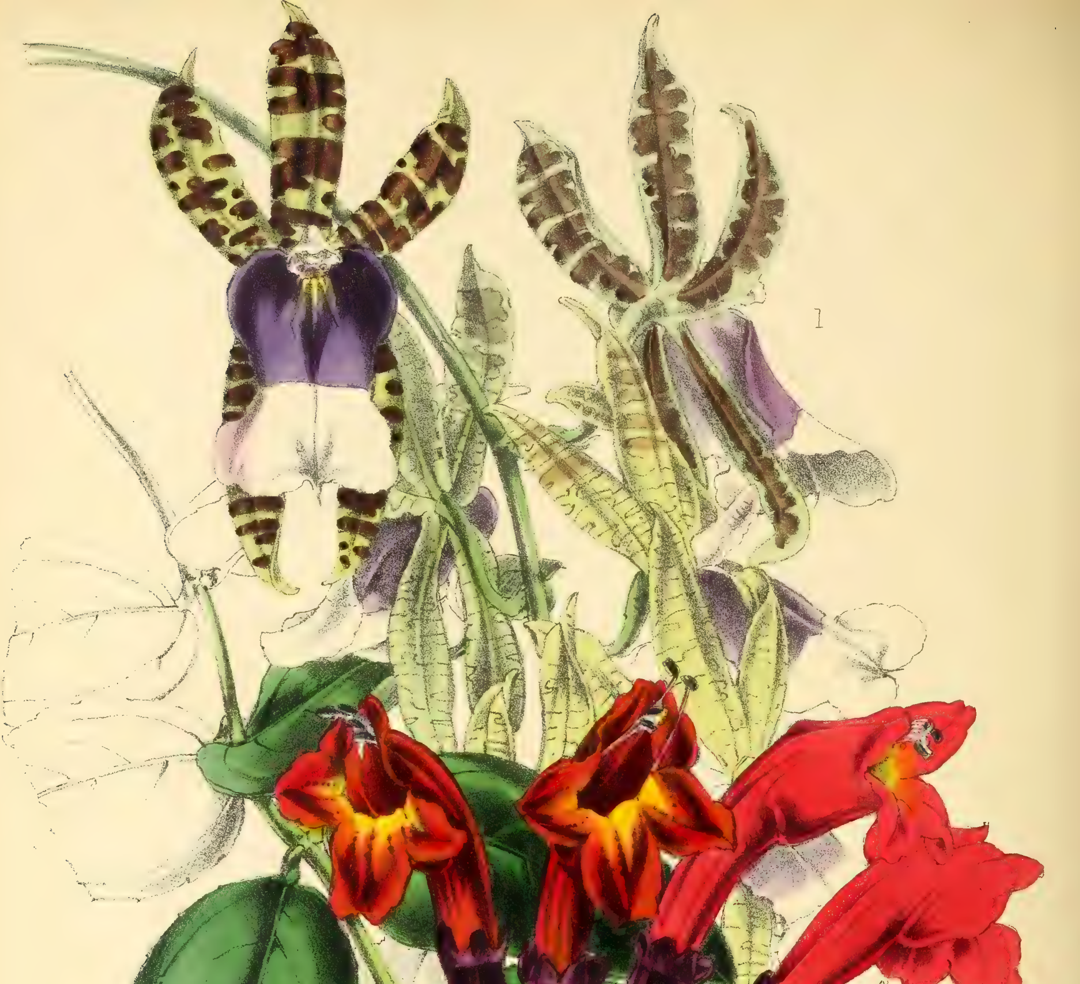
Glass.

Greenhouse and Conservatory. Little requires to be done in this department during the month of June; the work chiefly consists in keeping the houses gay, giving abundance of air, supplying well with water, and stopping the growing shoots of Epacris, Corræa, Chorozema, &c., to render them bushy.

Orchids and Stove Plants. Amongst Orchids-Stanhopeas are coming into flower; do not allow the buds to break themselves against the sides of the pots or baskets, give a free circulation of air, prevent aridity by throwing plenty of water about; securely screen from the sun's rays Orchids and such other plants as will suffer by exposure.

Open Air.

The early part of the month will be occupied with filling the borders and beds with half hardy plants for summer and autumn flowering; also in trimming, cleaning, training, and much other business which will not admit of delay.



S.Holden, del & Lith.

1 Miltonia Karwinskii.
2 Æschynanthus pulcher. —

PAXTON'S

MAGAZINE OF GARDENING AND BOTANY.

ÆSCHYNANTHUS PULCHER. (Pretty-flowered Æschynanthus.)

Class, Didynamia.——*Order*, Angiospermia.——*Nat. Order*, Gesneraceæ.——(Gesner-worts, *Veg. King.*)

Generic Character.—*Mag. Gard. & Bot.*, t. 67.

Specific Character.—*Plant* epiphytal, evergreen. *Stems* trailing, slender, rooting at the joints. *Leaves* lanceolate, rounded at the base, fleshy. *Petioles* short. *Flowers* in axillary and terminal fascicles, peduncled. *Peduncle* short, two-flowered, bibracteate. *Calyx* tubular, medium size, smooth, pale-green, tinged and spotted with reddish-purple; *segments* equal, blunt. *Corolla* tubular, wide at the throat, funnel-shaped, swollen at the base, of a rich vermilion scarlet, tinged with yellow in the throat, and barred with purple; *limb* divided into four spreading segments, *upper segment* two-lobed. *Stamens* exserted. *Anthers* joined in pairs. *Style* longer than the stamens.

Authorities and Synonymes.—Æschynanthus pulcher, *De Cand. Prod.* ix. p. 262; *Hooker* in *Bot. Mag.* 4264. Trichosporum pulchrum, *Blume's Bijdr.*, p. 764.

Our drawing of this fine epiphyte was made from a specimen which flowered in the collection of Messrs. Veitch and Son, Nurserymen, Exeter; by whom it was introduced from Java through their collector, Mr. Thomas Lobb. It is a plant of rare beauty, and a most profuse flowerer, continuing in bloom throughout several of the summer months.

Like the other species of Æschynanthus, it requires a warm and humid atmosphere, and may be either fixed to a block of wood, or planted in a basket of soil or moss, and suspended from the roof of the Orchid house, where it will be shaded from the fierce rays of the sun.

Of the eighteen or twenty kinds of Æschynanthus known to botanical travellers, fifteen or sixteen are already in this country; the greater part are exceedingly pretty, and all are of the easiest management.

Propagation is effected by cuttings of the half-ripened shoots planted in soil, and treated in the same manner as the parent plants.

ERICA PULVERULENTA. (Powdery Heath.)

Class, Octandria.——*Order*, Monogynia.——*Nat. Order*, Ericaceæ.——(Heath-worts, *Veg. King.*)

Generic Character.—*Calyx* four-parted, with a naked base, inferior. *Corolla* globose or urceolate, with a four-lobed limb. *Stamens* inclosed; *filaments* capillary. *Anthers* bifid. *Capsule* four-celled.

Specific Character.—*Plant* a shrub, covered with powdery down. *Leaves* verticillate, three in a whorl. *Flowers* terminal, purplish-red. *Corolla* ovate. *Bract* imbricated. *Anthers* awned.

Authorities and Synonymes.—Erica *Linn.* E. pulverulenta, *Bedf. Eric. Wob.* 20.

This very pretty species of heath is a native of the Cape of Good Hope, from whence it was introduced into this country in 1820, and is now pretty generally cultivated. The neatness of its habit, and the abundance of flowers it produces, recommend it to notice, and it well deserves to form one in every choice collection.

Our drawing was made in the nursery of Messrs. Rollisson of Tooting, in July, 1843.

It should be potted in a rough sandy peat, well drained with potsherds, and requires to be kept in a cool greenhouse, and treated like other moderate growing species; and cuttings root freely planted in pots of sand, and covered with a glass.

The generic name is derived from *ereico*, to break.

MILTONIA KARWINSKII. (Count Karwinski's Miltonia.)

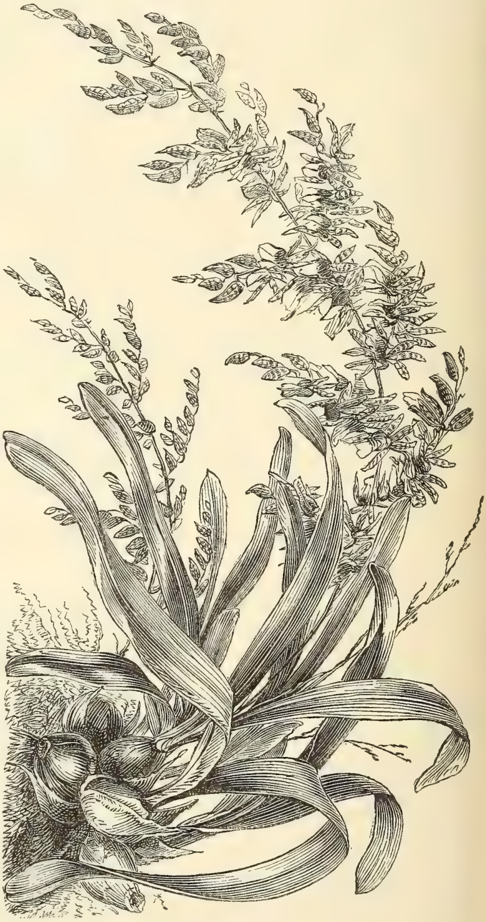
Class, GYNANDRIA.——*Order*, MONANDRIA.——*Nat. Order*, ORCHIDACEÆ.——(Orchids, *Veg. King.*)

GENERIC CHARACTER.—*Perianth* showy. *Petals* and *sepals* revolute, lateral ones connate at the base, sessile, similar. *Labellum* largest, dilated, undivided, sessile, connate with the column, lanceolate at the base. *Column* short, semi-cylindrical, eared at the summit. *Pollen Masses* two, with an oblong, adnate caudicula.

SPECIFIC CHARACTER.—*Plant* an epiphyte. *Pseudo-bulbs* oval. *Leaves* ensiform, narrow. *Scape* three feet high, rigid, nearly erect, many-flowered. *Flowers* large, showy, usually two and a half inches in diameter. *Bracts* small. *Sepals* and *Petals* lanceolate, nearly equal, of a bright yellow, barred and spotted with rich brown. *Labellum* cordate, contracted in the middle, two-lobed; *lobes* round, extremity pure white, middle pale-rose, base deep-violet. *Column* white, tinged with pale-rose, two-winged; *wings* serrated.

AUTHORITIES AND SYNONYMES.—Miltonia Karwinskii, *Lindl.* in *Journ. Hort. Soc.*, vol. iv., p. 83. Cyrtochilum Karwinskii, *Bot. Reg.*, sub t. 1992. Oncidium Karwinskii, *Sertum Orchidaceum*, sub t. 25.

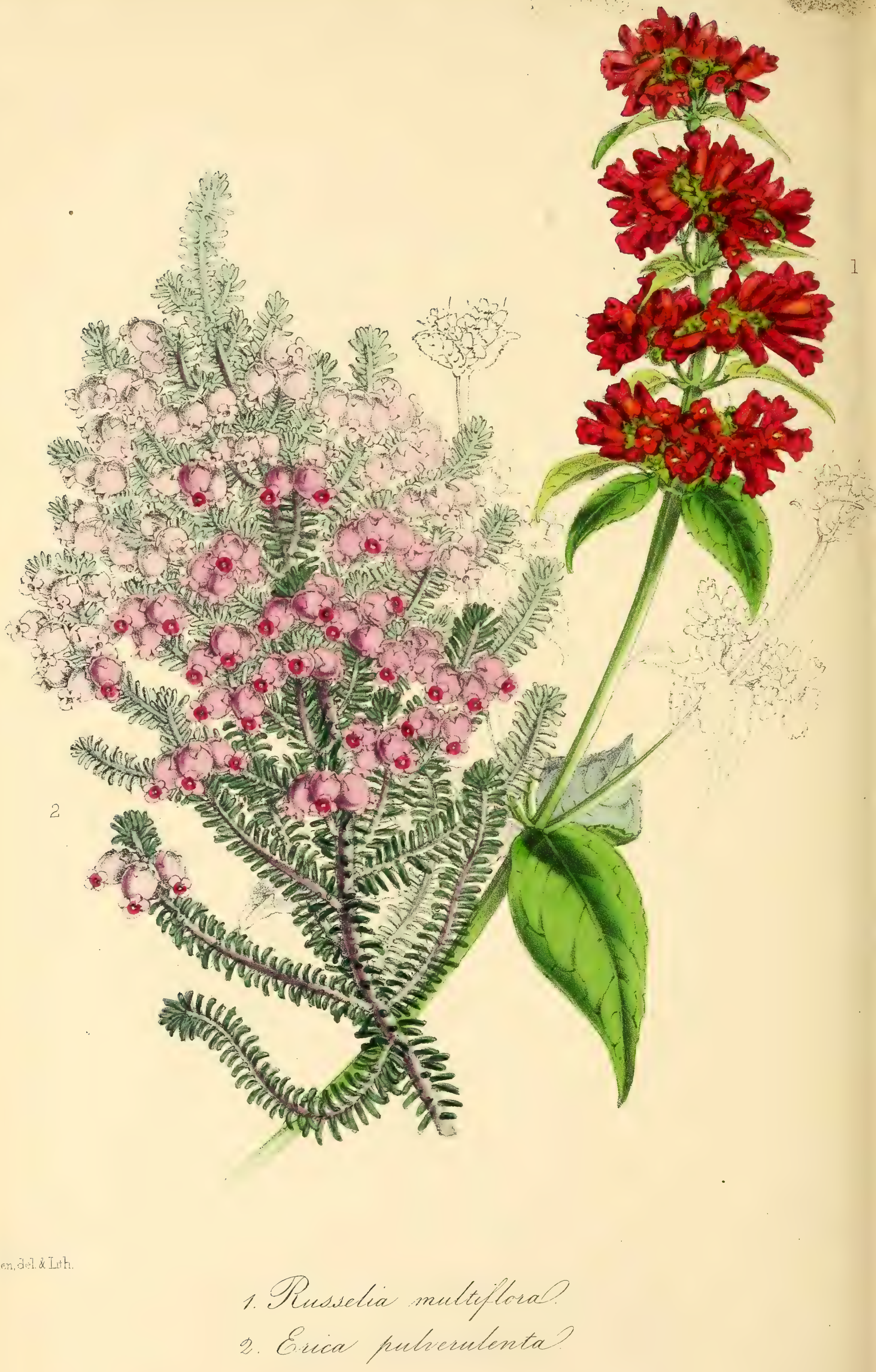
THIS very beautiful species of Miltonia was, according to Dr Lindley, first described from a small dried specimen, brought from Mexico, by Count Karwinski, and was then referred to the Genus Cyrtochilum, and subsequently to Oncidium; it has, however, since proved itself to be a true Miltonia.



The honour of introducing it in a living state to this country is due to the London Horticultural Society, who received it from their collector, Mr. Hartweg, who is supposed to have gathered it at Oaxaca in 1839. In habit and several of its important characters, it approaches *Miltonia Clowesii;* the pseudobulbs and leaves are somewhat similar, also the sepals and petals both in colours and markings, but the markings are of a much deeper and richer brown; the structure of the lip, too, is altogether different, and by which, and the column, it is easily distinguished. The scape grows nearly upright, rising to the height of 3 feet or more, being clothed with flowers from the extreme point to within 8 inches of the base.

It is said to require the same kind of treatment as Oncids, and thrives best in rather a cool temperature, and to be placed in pots filled with fibry peat and half-decayed leaves. Propagation is effected by division of the pseudobulbs.

The generic name is given in honour of the Earl Fitzwilliam, one of the greatest friends of science, and a great lover of Orchids.



Holden, del. & Lith.

1. Russelia multiflora.
2. Erica pulverulenta.

RUSSELIA MULTIFLORA. (Many-flowered Russelia.)

Class, Didynamia.——*Order*, Angiospermia.——*Nat. Order*, Scrophulariaceæ.——(Fig-worts, *Veg. King.*)

Generic Character.—*Calyx* deeply five-parted; *segments* acuminately tubular. *Corolla* tubular, swollen, and widened at the top; *limb* bilabiate; *upper lip* emarginately two-lobed; *lower lip* tripartite; *segments* nearly equal; *palate* convex, bearded. *Stamens* four, didynamous, inclosed; *cells of anthers* spreading. *Stigma* undivided. *Capsule* inclosed in the calyx, nearly globose, attenuately beaked, two-celled, two-valved; *valves* bipartite; *placentas* central, at length free. *Seeds* numerous, small.

Specific Character.—*Plant* a shrub 4 to 6 feet high. *Stem* quadrangular, smooth. *Leaves* opposite, ovate, acuminated, serrately crenated, glabrous. *Raceme* terminal, many-flowered, verticillate. *Peduncles* cymose. *Flowers* scarlet-rose. *Calyx* green. *Corolla* nearly an inch long; *limb* divided into five ovate spreading segments. *Stamens* four, two of which are longest.

Authorities and Synonymes.—Russelia, *Jac. Amer.* 178. R. multiflora, *Sims* in *Bot. Mag.*, t. 1528.

This plant was introduced to Britain so long ago as 1812 from South America, where it was discovered growing in a mountainous district between Vera Cruz and Mexico.

To grow it well, an atmosphere intermediate between the stove and greenhouse is the best. It should be potted in good sandy loam, mixed with about one-third peat, and a little sand. Give plenty of pot-room, and when growing a good supply of water. It is advantageous also to syringe frequently in fine weather, to prevent the appearance of insects.

Propagation is effected by cuttings of the half-ripened wood, planted in pots of sand, and placed under a glass in heat.

The generic name is given in honour of Dr. Alexander Russel, an English physician who resided for some years at Aleppo, and published an account of his observations upon the Natural History of that place, in the year 1756.

CHEMISTRY OF HORTICULTURE.

By John Towers, Esq.

(Continued from Page 135.)

Nitrogen, formed on the Greek noun *nitron* (νιτρον), and the contraction *gen* (γεν), the generator of nitre or saltpetre. This aëriform fluid, or gas, is in bulk the chief constituent of atmospheric air, as will be made to appear in its proper place. The terms *Nitrogen* and *nitrogenous* are now in the mouth of every scientific agriculturist, being applicable to all those substances which are proved to afford the strongest nutritive principles of plants and animals. In passing on to the description of the qualities of this interesting element, it may be remarked, that before the refined processes of modern organic chemistry had revealed the highly nutritious and sustaining properties of nitrogen, chemists had assigned to it the terms Azote and Azotic Gas, derived from the privative letter *a*, and the Greek noun *zoé* (ζωή) life, (destructive of life,) because life-sustaining as it is, when in combination with atmospheric air, it was found, when pure, to be fatal to animals which breathe.

This gas was first discovered or rather recognised as a distinct aëriform fluid, by Doctor Rutherford, of Edinburgh, in 1772; but he gave it no name and mentioned few of its properties. Dr. Priestley discovered it also, and in the same year—1772—described several of its qualities in the Philosophical Transactions. Thus, as in the discovery of oxygen, two philosophers laid claim, with equal right perhaps, to the recognition of the elements of that air which had been the supporter of breathing life from the period of the creation of man. Strange, that nearly six thousand years of recorded time should have elapsed, and the world remain in ignorance of facts so stupendous!

Our documents are numerous, and their authorities so unquestionable, as to admit of little comment. Some of these must now be cited in the order wherein they occur:—

1. Dr. Priestley obtained azotic gas by exposing a known quantity of atmospheric air to a mixture of sulphur and iron-filings, moistened into a kind of paste. Chemical action is thus induced, the filings attract the oxygen of the air, combine with it, and set the

nitrogen free. This experiment can be made with facility, thus : Mix together equal weights of the sulphur and filings, and put them into a glass-stoppered bottle, adding water sufficient to form the paste ; then close the bottle. In forty-eight hours the oxygen gas will be absorbed, leaving the nitrogen nearly pure.

2. Brande says—"According to Berzelius, the purest nitrogen is obtained by filling a bottle about one-third full of a liquid amalgam of lead and mercury, carefully stopping it, and agitating it with the inclosed air for two hours or more; the highly divided lead absorbs the oxygen and leaves pure nitrogen. On opening the bottle under water (the neck being, of course, held downward), the liquid rushes in, and thus shows the degree of absorption.

3. A third process is the following : Put a small piece of phosphorus on a cork, or into a little porcelain saucer floating on water, and ignite it; then hold over it, inverted, a tall glass shade like that used by gardeners to shade and protect some tender exotic ; the edge dipping about a quarter of an inch into the water, so as to prevent the entrance or escape of air. During the combustion, the phosphorus will unite with the oxygen of the inclosed air, and form phosphoric acid ; but as phosphorus has no affinity with nitrogen, *that* gas remains nearly in a pure state in the glass, after it has stood over the water, at rest, so long as to permit the white vapour of phosphoric acid to disappear.

4. The gardener can obtain nitrogen by adopting the following process,—not pure indeed—but sufficiently so, to ascertain its essential properties. He has only to substitute a short piece of wax-taper for the phosphorus, light its wick, and cover the burning taper with the tall bell-glass. This vessel, he is certain, must contain air only, and being made close at bottom by the water into which its edge is immersed, nothing extraneous can enter from without.

For a short time the flame will remain bright ; very soon, however, its extent and brilliancy will decline, and finally be extinguished. During the combustion, the water will (after the first few moments) rise in the glass, and continue to do so till the flame expires. The air then remaining above the water, will be chiefly nitrogen, contaminated with some carbonic acid, the greater part, however, of which has been absorbed by the water.

We have said that the two words Azotic Gas and Nitrogen express the same thing ; but as Brande justly observes, every gas (excepting atmospheric air), even oxygen itself, fails to support life, whereas, "if we consider the term Nitrogen, namely, as implying a component of nitric acid, it is explicit and unobjectionable ; we therefore adopt it in preference to that of Azote."

Properties.—These, as we find them described by the best authorities, are the following: —Nitrogen is lighter than atmospheric air, which, being taken as the unit 1, the specific gravity of nitrogen is estimated by Biot and Arago, as 0.969 ; Dr. Thompson, 0.972 ; Berzelius, 0.976 ; and if 100 cubic inches of atmospheric air weigh thirty-one grains, an equal volume of nitrogen under the same pressure and temperature should be (following the order above given) 30.04, 30.13, and 30.25 grains.

Nitrogen gas is transparent, colourless, void of odour and flavour.

It is fatal to animals when inspired by itself ; whence the name Azote, as before said ; and it instantly extinguishes flame ; but it enters into many combinations wherein its deadly properties are entirely changed, as in the instances of common air, and the highly nutritive qualities conferred by it on those animal and vegetable substances which contain it.

With oxygen it produces five distinct and definite compounds, namely, Nitrous Oxide ; Nitric Oxide, or Nitrous Gas ; Nitrous Acid ; Per-oxide of Nitrogen ; and Nitric Acid. This nomenclature has been somewhat modified by Dr. Turner, as will appear by the annexed table extracted from p. 114 of Dr. Fownes' Manual of Chemistry.

		Composition by Weight.	
		Nitrogen.	Oxygen.
1	Protoxide of Nitrogen	14·06	8
2	Deutoxide of Nitrogen	14·06	16
3	Hyponitrous Acid	14·06	24
4	Nitrous Acid (red fuming)	14·06	32
5	Nitric Acid (white „)	14·06	40

In our notice of oxygen gas, it was stated that its combining or single equivalent number is always represented by 8, the atomic weight being so many times heavier than that of hydrogen (the unit of English chemistry). Now, the combining number of nitrogen was, till lately, represented by 14, indicating that it was fourteen times more ponderous than hydrogen. Modern researches appear to have decided that its equivalent is 14$\frac{6}{100}$ths. Hence, the construction of the above table, wherein one proportional of each element combines to produce an oxide of nitrogen in its first or lowest condition, and so on, till with 5 of oxygen, $8 \times 5 = 40$, and one of nitrogen, we obtain the strongest Nitric Acid—one of the most energetic acids that has ever been discovered by chemical research, and which some of our readers will be astonished to find is produced by the electric union of those elements that constitute the bland and wholesome air that sustains animal respiration.

Nitric Acid, combined to saturation with potash, forms the common Nitre or Saltpetre of commerce. This salt is a natural production (though perfectly imitable by art) of India, and other dry countries; there " the soil is occasionally covered by a saline efflorescence like that sometimes seen on plastered walls. This substance collected, dissolved in hot water, the solution filtered, and left to crystallise, furnishes the saltpetre, enormous quantities of which were imported during the war by the East India Company.

Is nitrogen a simple element or a compound? This important question has not yet been satisfactorily answered. It has not been decomposed, yet there are facts which have induced chemists to consider it a compound. Among others, one described by Dr. Faraday may be cited; " An empty tube was filled with hydrogen gas, zinc foil, and a piece of caustic potash (called Hydrate of Potass, because it contains water in the solid form); it is evident that the only elements present were the metals, zinc and potassium, with oxygen and hydrogen which form the water contained in the hydrate; yet, on the application of heat, ammonia was evolved, as indicated by its action on moistened turmeric paper, placed in the upper part of the tube."

Admitting the correctness of the experiment, and that its phenomena could be borne out by repetition, under precisely similar circumstances, we should infer, 1st, that the change of colour produced in the turmeric paper, from orange yellow to a dingy red, must result from the extrication of some alkaline gas; 2nd, that either a minute portion of the potassa itself was volatilised by the heat; or that ammoniacal gas had been developed. Now, as we shall soon perceive, ammonia is composed of three proportionals of hydrogen gas, and one proportional of nitrogen gas: the question therefore arises, whence the required nitrogen, and what its source? Our authority does not enlighten us; neither does it say whether or not the pungent odour of ammonia was observed; it merely states that the nitrogen must have been derived from the combination of some of the elements enumerated!" If this were the fact, we can only infer, that nitrogen is either a compound of oxygen and hydrogen in some undiscovered proportions; or, that the presence of a metal is required to produce it. Here, however, we are in the dark, and therefore we must be content with the only fact which cannot, I think, be contested, namely, that since nitrogen, as it exists in the atmosphere, and when developed from its combinations, is an aërial fluid or gas, its particles—in common with those of all other gases—being separated, and kept apart in a state of minute division, by electric repulsion; therefore it is to be considered a compound of some peculiar base, with a certain definite quantity of electric matter. Again, this gas can be condensed, and made to exist in the solid form, as in the Salts of Ammonia, and many other compounds, by the abstraction of that agent which had retained it in the gaseous condition. Upon these and similar facts is based that Electrical Theory which it is the leading object of these articles to establish.

Ammonia, of which so much has lately been written in our modern works upon agriculture, furnishes several proofs corroborative of the attractive energy that is exerted between gaseous bodies, during which their form and qualities are materially altered. Ammonia, in the pure and natural state, is a gas; it is prepared in our chemical laboratories with great facility from sal-ammoniac and quick-lime; but nature produces it abundantly during the putrefaction of animal matter, by the combination of the two elements, hydrogen and nitrogen gases, at the moment they are extricated by the heat thus produced. Every fermenting mass, particularly if much urine be present, yields a volume of ammoniacal vapour that is conveyed into the atmosphere, and is returned to the earth by rain and snow showers. Liebig was the first chemist who demonstrated the actual presence of ammonia in rain water, a fact of great interest to the gardener, since it instructs him that the putrid exhalations from matters decaying on the surface of the ground are purified in the great meteorological laboratory of the atmosphere, instead of remaining below, as a source of epidemic and pestilence.

Ammoniacal gas is much lighter than atmospheric air. From the most critical and correct analysis, it should appear that three measures of hydrogen and one measure of nitrogen gas, condensed into two measures, constitute ammoniacal gas, the specific gravity of which, when compared with that of air, is as 0.590 to 1000. It perhaps is unfortunate that hydrogen and nitrogen, when artificially mixed, show no tendency synthetically to combine ; but we learn that, if a succession of electric sparks be passed through a small portion of ammoniacal gas confined in a proper tube, over quicksilver, the gas will increase to twice its original bulk, and lose that easy solubility in water which characterises gaseous ammonia. Again, by the agency of oxygen, and refined calculations which it would be irrelevant now to detail, chemists have discovered the proportions in which hydrogen and nitrogen gas naturally combine to produce ammonia.

In the next article, the subject of atmospheric air and its accessories will come under consideration.

ON VARIETY IN FLOWER-GARDENS.

By Mr. Moore.

Variety is, after all, the great idol which the majority of mankind worships; and for variety's sake it is the common fashion to make almost any sacrifice. Now, without attempting to decide whether or no this eagerness to bow before a shrine identified with inconstancy, be generally praiseworthy, as it is generally prevalent, it may surely be assumed, that at least, as far as regards flower-garden arrangements, there is little or no folly in becoming one of variety's devotees.

If this be true, the fact militates more or less against the practice of planting large masses of unbroken colours to make up a Flower-Garden. The end thus attained is no doubt a gaudy display ; but, paradoxical as it may appear, the question may be raised, whether, in such cases, gaudiness is not obtained at a sacrifice of effect. Doubtless there is, and ever will be, more than one opinion upon such a point ; but at any rate, it may not be assumed as unquestionable that a gaudy display and elegance of effect are synonymous. The fact appears to be that here we have a contest—not an uncommon one—whether quantity or quality should prevail. The great glare of colour in the one case, as the more attractive, is commonly set down as the more perfect result ; a decision which, upon the face of it, appears questionable.

But it does not therefore follow that colours should not be massed. To be effective, colour must be decided or obvious, and to be decided or obvious, it must not be too much broken or isolated. It seems, therefore, on the whole, that the effort to be made is rather to contract than to enlarge the groups of flower-garden plants, in order that a given space may show a contrast or variety of colour, instead of an unbroken monotonous hue. Size is however always relative, and what is large in one place would be small in another, so that no absolute rule as regards the size of masses can be drawn in respect to the distribution of colours.

It is some years since the circle was first recommended as the most desirable figure for flower-beds, and it is now, as it was then, true, that the more perfectly angles in flower-beds, and especially acute angles, are avoided, the better ; that is to say, if the bed is to represent a mass or any formal combination of colours ; for there is a tendency towards rotundity in the growth of all plants, which renders it next to impossible that angular outlines—especially sharply angular ones—should be fairly filled out with flowers.

The circular or rotund style of flower-beds certainly offers one of the readiest means of promoting variety in Flower-Gardens planted on the grouping or massing system. Instead of being entirely filled with one kind of plant, such beds may be very readily planted either in zones, or in divergent rays, and from the simplicity of their form, these arrangements of the plants, and consequently of the colours, are obvious, and, being obvious, they are effective. This can never be the case with intricately fitted angles, which, though pretty enough on paper, or even when cut out on the ground, lose all their distinctness when the plants come to grow up in them.

Whether or no circular beds, or beds of rotund character, become more generally adopted, it seems to be desirable that an attempt should be made to impart greater variety to modern Flower-Gardens, by the more frequent adoption of what may be called compound planting, or, in other words, by forming the larger groups or beds in a Flower-Garden of several colours in distinct masses, instead of employing one colour only, these several colours being so disposed as to harmonise or contrast as the case may be, both with those in the same group, and those in the groups adjoining. The individual masses, or sub-groups themselves, should be distinctly recognisable both in respect to size and outline. Probably almost every garden might in this way be made to contain three or four times as many kinds of plants, as if otherwise filled; and this change might be made without any sacrifice of the general effect, but would be rather productive of improvement. Touching this very bearing of the subject, it has been pointedly asked, Is a red-cloak more elegant than an embroidered shawl?

This or some such principles brought into operation would tend greatly to supply Flower-Gardens with what they stand much in need of—a greater variety of vegetable forms. As it is, too much deference is paid to mere colour. For example, because the Verbena combines, with a habit and other characteristics admirably adapting it for grouping, considerable variety of colours, mostly brilliant and striking, it is by no means clear, if mere colour is to continue the chief object of attraction, that we may not yet live to see the time, when the term "Flower Garden," will be almost an equivalent to a "Garden of Verbenas." A garden of Verbenas, however, would have nothing like the interest that attaches to a garden of varieties.

ON DISPOSING PLANTS IN SHRUBBERIES AND PLANT-HOUSES.

By Mr. Kemp, the Park, Birkenhead.

If any person will take the trouble to examine in detail a border or interior of a plant-house which has previously given them pleasure in gazing upon it, they will soon find that it owes its beauty and character to a few prominent, taller, and well-shaped or picturesque specimens, which have been fortunately or judiciously placed here and there along its front lines, so as to throw them into salient points and render the whole length of them worthy of inspection. Let such a border or mass be compared with one in which, commencing with low plants in the front, each row rises gradually and regularly towards the back and forms one continuous bank, the angle of which, taken at any one point, is the angle of all the rest; and the difference between art exercised according to nature, or in aid of her arrangements, and art in its simple, unrefined and uncultivated state, will immediately be seen.

All art of the highest kind, and such as gives the greatest satisfaction in its creations and combinations, must necessarily be based upon what is natural; and in landscape-gardening especially, the highest and finest forms of beauty will be a carrying out, developing, and refining upon the varied features to be found in a natural scene. Hence, the principles on which the most agreeable and delightful assemblages of vegetable forms can be composed, may be gathered by a diligent observer in wandering through any of those districts most celebrated for their natural beauty.

One of the principal of the rules which may thus be deduced, is, that whenever anything like continuous masses of vegetation occur, their front outline is marked by the utmost freedom and irregularity, and, when from any cause it approaches to something verging on straightness, this is relieved of all tameness or monotony by the extreme variety in the heighth or character of the plants composing it.

And this rule is not merely susceptible of application in any garden scene, but the character of that scene will be stamped as interesting or otherwise, in precise accordance with the extent to which such a principle has been observed or violated.

Nor must it be supposed that, however small any garden object may be, it is exempted from the operation of recognised principles. It is not the size of a plantation or group of plants which either brings it within, or places it beyond the reach of acknowledged rules. A mode of arrangement may be beautiful or defective, apart altogether from any consideration of extent. And, indeed, it is in small matters that a tasteful disposal of the constituent parts tells with the best effect, for the impression to be produced is in such cases more dependent on artificial means, as nature will herself do something towards creating a good result where everything is on a large scale.

It is necessary thus to show how the rules of art apply to the smallest object or collections of objects, because it is mainly with plantations of so limited a character as to be properly termed shrubberies, and with in-door exotics, which are never made to cover any very large area, that this article is now to deal.

If we suppose an artist of eminence introducing into one of his pictures a group of whatever size, of human beings, cattle, or various vegetable forms, we should in an instant perceive the absurdity and want of taste displayed, if he placed them in rows, so that the objects in each row ranged about the same height upon the canvas, those farthest off being of course highest. No variety of costume, figure, features, or accompaniments, would atone for such a radical defect. And yet this would only be in conformity with the practice of arranging plants, whether on stages or borders, in regular successional rows, the highest at the back.

But if, on the other hand, we imagine the artist scattering his figures about, so as to make their relative heights and general arrangement as varied as possible, some one, two, three, or more of them having particular prominence given them, and either rising higher in the back ground or advancing further forward in front, and the whole insensibly blending and harmonising, so as to form but one great assemblage ; though, perhaps, partially broken up into several different subordinate groups ; every one, however unable to appreciate the process of art by which all is accomplished, will be pleased with the general result, and will glance from object to object, and from group to group, with a heightened relish for the entire performance, from the gratification which each part has occasioned.

And thus it is with a well arranged shrubbery, border, or plant-house. There is enough in the details to occupy the attention and please the eye throughout the entire collection, while the attractiveness of the whole is rendered all the greater by the interest of the several parts. It is not all seen at once, but leads on the spectator from point to point, presenting to him, in however limited a space, continually fresh parts. There are no true or regular lines. But all is freeness, variety, and grace. And all the best specimens, of the finest and most peculiar form, stand out in relief, and are thoroughly seen.

The objections to the more common method of arranging plants, so as to slope gradually and uniformly from the back to the front of the border or stage, are, that the effects just specified are entirely reversed. The eye takes in all at one look, and there is no inducement to the spectator to pass along the front and examine it minutely. Being all placed at a regular angle, also, the plants lose their individuality. There is no play of outline, no wavy line of beauty, no patches of intermingled sunlight and shadow. The finest and most beautiful plant ranks on a level with the most insignificant, and is only equally seen. In fact, it is merely the tops of each specimen that present themselves to the observer, and whatever there may be remarkable in either habit, foliage, or flowers, is, to a great extent, lost, by being mingled with the common mass.

A most striking illustration of the evils which attend this old system of arrangement was brought before the writer in a walk, a few months back, through the handsome large stove recently erected at the Royal Botanic Gardens, Kew. In this noble house has been placed one of the most magnificent assemblages of tropical forms of which it is possible to conceive in a country like England. Splendid and extraordinary foliage and habit meet one at every step, and the utmost verdure of healthiness prevails. But a most unhappy adherence to the old mode of arrangement spoils and neutralises the effect of the whole; so rigidly, indeed, has the plan been carried out, that scarcely a leaf seems to have been permitted to stray beyond the prescribed angle, and the eye travels along a bank of foliage replete with the most ornamental and elegant of forms, with about as much interest as if they were in a common shrubbery border.

Nor is the absence of anything like a picturesque or tasteful effect, where such a multitude of fine materials exist, the only consequence of such an arrangement to be deplored. For each plant, placed thus only to show its upper leaves, will of course soon become—what many of them have already done from a course of such treatment—a mere tuft of leaves with a long bare stem, so that its real character will never be exhibited.

It should be observed, however, that this particular instance is only mentioned for the sake of exemplifying what has been previously said, and because it appeared so glaring an illustration, in so large a house, with such rich and ample means of furnishing it appropriately, of the great disadvantages of the system we are now condemning.

But these remarks will probably be of little general use, unless, with a description of the evil itself, the way in which it may be remedied is not also lightly traced out. In plant-houses, little of course can be done in regard to the form of the stages, where stages are employed, as these must, in many instances at least, be composed of straight lines. Hence, where the house and the plants are large enough, a much better effect may be obtained by planting out the specimens in beds, or placing them in pots or tubs on the floor, dispensing altogether with stages. In such cases, the greatest variety may be easily realised, and as pleasing a result produced as by the tasteful disposal of groups of shrubs and single specimens on lawns. Still, there are few houses, comparatively, which admit of such an arrangement.

In smaller ornamental houses, where room is not so much an object as elegance and display, and where the building is glazed all round, as it should be, except where it adjoins the mansion, something may be done in the way of relieving the tiresome sameness of straight stages, by breaking them up into a greater number of various figures, such as circles, ovals, octagons, &c. These, if nicely fitted to each other, and adapted to the style of the erection, will accomplish much towards giving a varied and pleasing aspect to the interior of a conservatory.

Nevertheless, the best mode of rendering a plant-house as attractive as possible in the outline and irregularity of its ornaments, is to arrange the plants on the stages, whether these are straight or otherwise, so that here and there the best and finest specimens shall jut out, at very varied intervals, on the different shelves of the stage, and that the interspaces shall be filled with plants differing as much as practicable in size, shape, colour, &c. Towards the front, again, particular points may be rendered more prominent by placing several large specimens together. Climbers, trained to trellises fixed in the pot, will also be very useful for placing about in this way. And with climbers hanging in a more or less profuse and clustering manner from several parts of the roof, trailing plants and low climbers unsupported by stakes, suspended in the air by wire or small chains, and in the case of stoves, plants growing in moss or on logs of wood against any moist shaded wall of the house, almost as much freeness and elegance may be attained as will give to the place a natural appearance, and banish all kinds of stiffness and formality.

Successfully to diversify the character of out-door shrubbery borders is a much less difficult matter, although the execution of it requires some taste. Here the main thing is to place advantageously the larger-growing kinds of plants, especially the evergreens; for if the outlines are merely broken by deciduous shrubs and low trees, their effect will be hardly appreciable in winter. It matters comparatively little as far as the desirableness of having the plants of various heights is concerned, whether the border be a straight one, or have a wavy and broken margin. Perhaps, however, variety is the more characteristic and necessary when the outline of the border is irregular.

Particular care should be given to use some of the boldest plants along the extreme front, although the first rank should be at very different distances from the walk, and have as much contrast as possible in height and hue. Occasionally, too, the bold points should be made up of a group instead of a single specimen. And they must be distributed through the border at as great a variety of distances from each other, and from the walk, as if nature herself had occasioned them.

These larger plants or groups will vary in kind very much according to the size of the border, and the materials with which it is stocked. If the border be broad, and planted with a general stock of the usual mixed sorts, the salient points must of course be composed of the largest evergreens, such as Pines, Evergreen Oaks, Hollies, Arbutus, &c. But if it be narrow, and filled with smaller things, a lower-growing tribe will serve to diversify it, as Rhododendron, Standard Roses, and many of the finer kinds of shrubs. Tall weeping plants, and climbers trained to poles, will often be useful towards the front, while the climbers may ever be distributed advantageously throughout the entire border.

Whatever specimens are employed to break the front line, they should always be well formed, and be clothed with branches quite down to the ground, so that they may have a similar use, in this respect, to lower things. If, likewise, they are made to stand on the grass at a few points, their purpose will be still better answered. Deciduous plants are, however, somewhat undesirable for this latter object, as they are apt to kill the grass beneath them when they are covered with leaves, and this presents a withered and bad appearance when they are again denuded of foliage. When, therefore, deciduous plants are used to stand out as specimens on grass, they should be chiefly Thorns, Mespilus, or such other kinds as do not feather down to the ground, so that the grass below them may not be killed in summer.

THE ROSE.

> Yet 'mid the melancholy night,
> Some scatter'd honours give delight;
> And here and there a Rose is found
> Neglected on the chilly ground.

The increased taste for Horticulture, which has of late years manifested itself so remarkably in England, and the rapid progress made in the practice of that delightful art, has rendered the history of every plant, coming under its protection, a source of useful and interesting study. While on the one hand we are invited to consider such plants in connection with their natural habits and localities, so on the other are we allured, by the promise of information and pleasure, to inquire into their early history and associated legendary lore.

The Horticulturist has ever bestowed upon the "daintie Rose" especial notice, and by his evening caution, and his morning care, by watchfulness for many days, how often has he attested the anxiety with which he awaits the unfolding of this cherished flower? By such, some few memorials of the Roses, culled from classic fields, and breathing an almost unequalled love for them, will be received with interest.

Among both the Greeks and Romans, great attention was paid to the cultivation of flowers, which were generally employed as ornaments, and as offerings; as offerings in the temples of their deities, and as ornaments on occasions of public or private festivity. Like as it has been, and is now, though less frequently, among ourselves, so was it with those ancient nations; the bride was decorated, and her pathway strewn, with flowers; flowers, too, were scattered on the bier, and were found fading on the tomb. They floated also in the wine-goblet of the fastidious epicure, shone in the chaplet of beauty, and in later times formed the victor's wreath.

The Romans, however, appear to have esteemed flowers more than the Greeks, and the origin of this greater regard for them may not improbably be found in the imitation of that luxury and splendour which the Romans had witnessed in Eastern countries. Yet, from the writings of both the Greek and Roman poets, we must infer a prevalent love of flowers, and that there existed a disposition to rear them with care. By these writers, flowers are made objects of constant allusion, of the most beautiful and touching comparisons. "The 'fair-clustering' Narcissus, and the 'gold-gleaming' Crocus, were reckoned among the glories of Attica, as much as the Nightingale, the Olive, and the Steed; and the Violet was as proud a device of the Ionic Athenians, as the Rose of England, and the Lily of France."*

Such, indeed, among the Romans was the taste for flowers, that we find Horace lamenting that fields, once given to the plough, were now dedicated to the cultivation of flowers and shrubs, and, as he says,

> Where flourish'd once the Olive shade,
> And its rich Master's cares repaid;
> The Violet and Myrtle greets
> The sense—a luxury of sweets.—*Francis.*

The cultivation of flowers, as one of the delights of the country, is frequently mentioned by Cicero, in his work on 'Old Age;' and Virgil in his fourth Georgic, says,

> Now—did I not (so near my labour's end)
> Strike sail, and hast'ning to the harbour tend—
> My song to flowery gardens might extend;
> To teach the vegetable arts; to sing
> The Pæstan Roses, and their double Spring.—*Dryden.*

The first Rose of Spring is mentioned by Virgil when describing the delights of the 'old Corycian swain,' when he says of him—

> To quit his care, he gather'd first of all,
> In Spring, the Roses.—*Dryden.*

Horace, on the other hand, alludes to the last Rose of Summer, when he bids his attendant

> ——Search not where the curious Rose
> Beyond his season loitering grows.—*Francis.*

The moral which Burns drew from his "mountain daisy" had been marked before by Virgil,† when, relating the death of Euryalus, he says,

> His snowy neck reclines upon his breast,
> Like a fair flower by the keen share oppress'd.—*Dryden.*

and more than once it is alluded to by Catullus. Indeed, a glance at the Eclogues, the Georgics, and the Fasti of Ovid, will show the same love of flowers in their authors, which evidently animated Aristophanes when he describes the gentleman of "merry old Athens" as "redolent of honey-suckle and holidays,"‡ and when we remember, that from the last writer we learn that at Athens flowers were sold in the markets.

The earliest mention made of the Rose is generally attributed to Homer and to Anacreon, but considerable doubt exists, as to whether the plant mentioned by these writers is identical with that subsequently mentioned under the same name, and now known to us. Some learned writers of the present day have come to the conclusion, that the Odes, usually attributed to Anacreon, are the compositions of an author who lived long after the period during which Anacreon flourished, and that a Rose-blossom, possessing the characters described in those spurious Odes, was not known to the Greeks at the time of Anacreon.

On the consideration of this point it would be out of place here to enter fully, and for the present we must be content to date the commencement of our history of the Rose with the account given by Theophrastus, in his History of Plants, which was published B.C. 314.

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* Quarterly Review, July, 1842, p. 198.

† Edinburgh Review, July, 1842, p. 198.

‡ Ibid.

Theophrastus classes the Rose-tree with woody and perennial shrubs, and mentions it among those plants which have their fruit growing under the flower; a peculiarity, he adds, which on account of its great size is very plainly to be seen in the Rose-tree. He says that Roses may be distinguished from one another by the roughness or smoothness, colour or smell, and the greater or smaller number of their flower-leaves, and by the latter character he classifies those he mentions, which are four in number, namely, the Five, Twelve, Twenty and Hundred-petalled Rose.

The first of these, or the Five-petalled Rose, is considered by Stackhouse to have been the Rosa canina, or Dog Rose, of Linnæus.

The second, or Twelve-petalled, has not been as yet referred to any species with which we are acquainted.

The third, or Twenty-petalled, is thought to resemble the Rosa cinnamomea or Cinnamon Rose, and

The last, or Hundred-petalled Rose, is regarded as the Rosa Centifolia, or Hundred-leaved Rose, with which almost every one is well acquainted.

Of the last of these Roses, Theophrastus says, the inner flower-leaves are exceedingly small, for the mode of blossoming is such that some are turned inwards, and some outwards; that is to say, some of the petals curl towards the centre, while others expand towards the circumference. The greater number of this kind of Rose, he adds, are found in the neighbourhood of Philippi.

He further states that the Rose is not a large flower, and what appears singular and almost incredible, that it has not a pleasant odour.

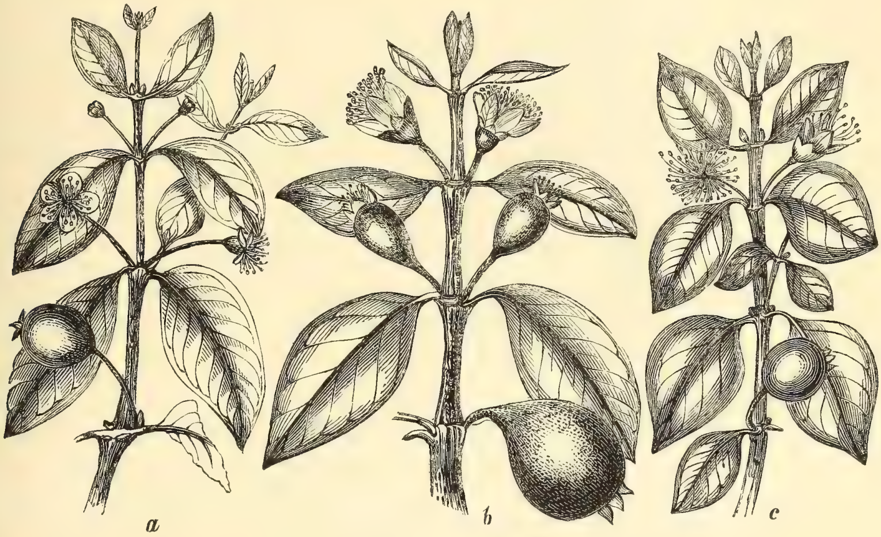
From what has been said, it will be seen that this writer gives no very detailed account of the Roses he has mentioned.

We shall next pass on to Pliny.

ON THE CULTIVATION OF THE GUAVA (PSIDIUM CATTLEYANUM.)

By Mr. William Tillery, Welbeck.

As the cultivation of the Guava is not generally followed with that attention that the excellence of its fruit merits, I therefore beg to give a short account of its management at this place, where I have been successful in fruiting it for many years past. The fruit of this variety is highly prized by some, both for dessert and ice, despite its slight turpentine flavour; and as the trees in general ripen two crops in the course of the autumn and winter months, they fill up a vacancy in the way of variety at a time when other fruit are scarce. We have four trees planted here on the back of a large orangery; their branches are trained horizontally, and as they break nearly opposite one another, they are tied to the wires with symmetrical effect. The soil they are planted in is a rich sandy loam mixed with peat. The border is only 2 feet wide and about 18 inches deep, and well-drained. As the roots of the Guava are very fibrous they do not range over so large a surface as many would suppose, but they require good doses of liquid manure during the period of swelling their fruit. At this place I frequently water them from a tank where deer's dung has been steeped in, and they seem to thrive amazingly with it. As soon as the flower-buds begin to show, the shoots are stopped, and during the blossoming period the trees are frequently syringed with a fine syringe, as I find the fruit sets better by this method than keeping them dry. When they set too thick, I thin them out to three or four on a spur, so as to have them large and fine. Near the tops of the trees, where there is plenty of light, the fruit grow as large as a middling-sized plum, and even in the middle of winter are as black as sloes in colour. They are then deliciously flavoured, something like a strawberry, with a slight aromatic taste. The only insect that infests the Guava much, is the thrips; they pierce the cuticle of the young fruit, turning them to a rusty colour, which makes them crack before they are ripe. This pest is easily got rid of by syringings and fumigations of tobacco, repeated at intervals of a few days, so as to destroy all the young generation. The mealy-bug and brown scale do not like the turpentine flavour of the juice of the plant, for I have never found them on it in any quantity. They infest, however, *Psidium Pomiferum* and *Pyriferum*, and it is no easy matter to get rid of them from the rough nature of the leaves of these varieties. I have cultivated some six or seven varieties of Guavas altogether, but find they are all worthless as compared with *Cattleyanum* in flavour. One, a large-fruited white variety from Madras, has the most delicious aroma, when the fruit is ripe, of any kind of fruit I know; but the inside is full of seeds, and the flavour is harsh and disagreeable.



DESCRIPTION OF THE WOODCUT.

a Apple-shaped Guava—Psidium pomiferum. *b* Pear-shaped Guava—Psidium pyriferum. *c* Cattley's Guava—Psidium Cattleyanum.

ORNAMENTAL PLANTS FOR SUCCESSIVE DISPLAY IN THE FLOWER-GARDEN, DURING THE LATE AUTUMN MONTHS. &c.

By William Wood, Fishergate Nurseries, York.

Amongst the most useful of plants for decoration in beds *en masse*, are those which give out a late and long continued bloom, whether regarded for successive or permanent effect. The following descriptive sketches refer to some of the most useful, for their after-adaptation in being removed into pots at a late period, and transferred from the open ground as portable specimens for adorning the Greenhouse and Conservatory departments, during the late autumn and winter months.

1. Bouvardia triphylla splendens. The finest variety in cultivation; it is a neat and ornamental half-hardy plant, 12 to 18 inches high, with terminal nodding clusters of rich scarlet trumpet-shaped flower-tubes, from July until October, forming a neat group or bed, requiring to be planted tolerably close, and though blooming freely in good ordinary soils, it is improved in habit, colour, and amount of bloom by using equal portions of sandy loam and heath-mould.

2. Bouvardia triphylla angustifolia. Of similar habit and character to the preceding, but more slender and graceful in its style of growth.

3. Cuphea platycentra. A remarkably neat dwarf and compact plant, from 9 to 24 inches high, with a profusion of bright vermilion-coloured flower-tubes throughout the autumn and winter months. Admirably adapted for small or large beds; though thriving and blooming profusely (when planted out) in ordinary soils, it succeeds most perfectly in heath-mould. For pot-culture, equal portions of sandy loam, heath-mould and unfermented leaf soil is most suitable.

4. Zauschneria californica. A small decumbent plant of neat growth, from 9 to 18 inches high, with bright orange-scarlet flowers, from July until October. From the impatience which this plant manifests under seclusion or shade, in ordinary pits or houses during the spring months, it is probable that this very beautiful plant will require a fuller exposure to light, and an artificially prepared soil, where it is otherwise naturally stony and retentive. Heath-soil appears to be inimical to its growth whilst in a young state. One-fourth of pounded bricks or potsherds, reduced to the bulk of split peas, added to the soil, has been found beneficial in its culture under ordinary treatment.

5. Justicia pumila. A neat dwarf greenhouse shrub of small twiggy habit, and thin willow-shaped leaves, from 9 to 18 inches high, producing a profusion of rich crimson scarlet trumpet-shaped flowers, from July until September, and forming a very ornamental and distinct group or small bed. This comparatively rare and desirable plant becomes deciduous in the winter, and requires a dry intermediate house for its winter protection.

6. Lyperia pinnatifolia. A small dwarf branching greenhouse shrub, with neat divided dark-green foliage, ornamented with a profusion of conspicuous violet-purple Lobelia-like flowers, from August until October. Forming an elegant small group or bed, the most beautiful plant of its colour.

7. Senecio elegans atropurpurea. A greenhouse biennial plant of favourable habit, from 12 to 18 inches high, with numerous rich, double purple-crimson flowers, from July until October; forming a neat small bed. In retentive soils or wet seasons requiring nearly one third of small broken brick or potsherds intermixed.

8. Lobelia erinus grandiflora. A well-known but beautiful dwarf compact variety, 4 inches high, yielding a long continued succession of rich deep-blue flowers, from July until October. Admirably adapted for small or large beds, marginal edgings, or portable specimens in pots. Undoubtedly the best of its section and colour for effect *en masse*, and for yielding a successive display by previously prepared stages of growth.

9. Lobelia erinus lucida. Considered an improvement upon the preceding one, for culture in small pots. It is somewhat similar in habit, and producing rather larger rich blue blossoms, with a more conspicuous white centre. Being thinner in its growth it is incapable of yielding an equal continuation of bloom; it is more beautiful but less useful, and requires strict attention to the removal of premature flower-buds to induce greater fertility.

10. Lobelia erinus compacta. This is a much smaller plant, and much more compact in its growth than either of the preceding, producing a profusion of bright azure-blue flowers, from July until September. Being less robust in character, and liable to produce its flower-buds almost simultaneous with its growth, it requires special attention in obtaining a vigorous and accumulated growth under a genial temperature, in a close frame or greenhouse, before being allowed to manifest symptoms of bloom. If allowed to form attenuated or excited growth, it should be "cut back" to form more vigorous shoots. When seen in its true character, it forms an exquisitely beautiful object for a group or parterre, or placed within a suitable niche upon a low piece of rock-work or rural mound.

11. Lobelia erinus alba. A neat and free-growing variety 4 to 8 inches high; dwarf, and compact in its habit, yielding a profusion of snow-white blossoms, from July until September. Adapted for small or large groups, and certainly the best of its colour. The varieties of *L. erinus* are remarkably well adapted for producing a successive display, by raising two or three stores at different periods in the spring, from vigorous plants of the current year's growth, and only permitted to bloom towards the period required.

12. Ageratum grandiflorum. An ornamental and free-growing plant of neat habit, from 1 to 2 feet high, producing numerous clusters of elegant light azure-blue flowers, from

the middle of July until October. Forming a fine late summer and autumn bed for background effect, if encouraged in its upright growth, and equally adapted for a front group, if the first stages of growth are neatly secured to the ground by hooks, observing in this, and in most other plants, to place the most vigorous plants towards the centre of each bed.

HINTS ON THE CULTIVATION OF YELLOW ROSES.

By William Paul, Nurseries, Cheshunt, Herts.

Living among Roses, where the presence of nearly two thousand varieties forms a great source of attraction, it is my good fortune to enjoy the privilege of interchange of thought with many of the principal connoisseurs of this flower. To such, of course, I do not address these observations. But there are others, whose love of roses exceeds their knowledge of the art of culture, and by such, how often are the questions raised, "Have you any Yellow Roses ?" "Are they not very difficult of culture ?" The answer to these questions will be the subject of the present paper.

To the first question, we reply, " There are Yellow Roses, but their number is few." To the second, we can faithfully say, " They are not difficult of culture, but they require a treatment somewhat different from that bestowed on Roses in general."

It has been customary to class as Yellow Roses, kinds that are not purely yellow, such as the yellow Banksiæ, and varieties of the Noisette, and Tea-scented, in which there are traces of this colour intermixed with buff, salmon, sulphur, straw-colour, and even white. Into the justice of this classification we need not stop to inquire further than to remark that, as the Botanical and Horticultural Societies of London have rejected it, there are grounds for anticipating a fresh arrangement. But till such occur, we must stand upon the old ground, and will proceed at once with our remarks on culture.

Yellow Roses, then, may be considered as of two kinds—1st. Pure yellows : 2nd. Shaded yellows. To the first belong the Persian Yellow, Harrisonii, Yellow-brier, and single yellow Austrian Roses; also, the old double yellow, belonging to Rosa Sulphurea of Botanists.

The Persian Yellow was introduced from Persia through the Horticultural Society, in 1837, and is of undoubted merit. It may, with justice, be called the King of the Yellows; the colour is pure and golden, and under proper treatment it is a profuse bloomer. The plant, when young, grows vigorously, sometimes making shoots three feet in length in the course of one season, but this rate of growth is not sustained from year to year. Pruning is an important operation here; the main shoots should have the mere tips cut off, as the flower-buds are produced from the eyes near their summit; consequently, if these are all removed, there will be no flowers, the eyes near the base producing wood-shoots only. As the eyes are placed at small distances, it is well to remove some after pruning; often two or three may be rubbed out together. The plant seems rather impatient of manure unless given in a thoroughly decomposed state. It should be planted in turfy loam, mixed with one-eighth each of lime, river-sand, and leaf-mould. It is admirably suited for pot-culture. I have six plants, which were potted last Autumn, bearing nearly 500 healthy flower-buds, the whole of which I expect to expand. They were treated as follows :—After being potted and pruned, the branches were drawn down and fastened to a wire passed beneath the rim of the pot, so as to form an umbrella-shaped head. Two-thirds of the yet undeveloped buds were rubbed out, leaving four or five near the base to form flowering-wood for the next year. One plant that was *slightly* forced has bloomed beautifully, and the flowers of the others which have been shaded are now showing colour. No green-house or parterre should be without the Persian Yellow.

The Harrisonii, or American Yellow, is a garden seedling, introduced from America about fifteen years since. This is even a more profuse bloomer than the last, but is paler in colour and less double. It thrives in the same soil and requires similar general treatment, but, making branches more plentifully than the preceding, it requires more thinning when pruning.

The Double Yellow-brier closely resembles the Harrisonii, but is still paler. The single yellow is about the same colour, with single flowers. Both of these flourish with the same soil and treatment as the former.

The old Double Yellow is, surely, the most capricious of roses; few who know its history essay to cultivate it. Sometimes, indeed, it produces an abundance of flower-buds, but, as John Parkinson said of it early in the seventeenth century, "The flower is so thick and double that very often it breaketh out on one side or another, but few of them abiding whole and fair in our country." The main conditions for successful culture appear to be a tolerable rich free soil, a pure dry air, and a mild genial spring. These conditions can be rarely combined, and even these will not *ensure* success. The most probable chances appear to consist in pot-culture. Get a healthy plant well established, and grow it under glass in gentle heat, pruning but sparingly.

Perhaps this is not an improper place in which to mention the two or three varieties of Yellow Scotch Roses (*R. spinosissima*), although they can scarcely be called pure yellows. These are best fitted for cultivation, as bushes, in the flower-garden. The flowers are globular, neat, rather small but well formed, producing a good effect *en masse*. A Scotch Rose in full bloom forms a very interesting object; it thrives in almost any soil.

We have now to speak of the Shaded Yellows, which form a more numerous family. They belong to the Tea-scented and Noisette (*R. indica*) of florists. But where to begin and where to end is a point of difficulty. If we take any from these groups, we must include some of various shades, for the tints from yellow to buff, salmon, sulphur, &c., are so nicely shaded off through different varieties, that it is difficult to fix the line of demarcation. A few of the yellowest among the Tea-scented are these:—Abricote, Aurora, Cleopatra, Devoniensis, Eliza Sauvage, Jaune, La Renommée, Mirabile, Moiret, Pellonia, Princess Adelaide, Safran, Smith's Yellow, and Vicomtesse de Cazes. Among the Noisettes there are:—Clara Wendel, *Cloth of Gold, *Desprez, Euphrosyne, *Lamarque, Le Pactole, *Solfaterre, all partaking somewhat of the nature of the Tea-scented.

The Tea-scented and Noisette Roses are, with the exception of those marked with an asterisk, best suited for pot-culture, as they are, for the most part, liable to be injured by exposure to frosts. Whether grown on their own roots or budded, they should be potted in soil composed of loam and leaf-mould, or, in default of the latter, well pulverised manure, adding a little sand if the loam be adhesive. For these (the kinds marked with an asterisk excepted), close pruning is advocated. They should be kept under glass either in a pit or green-house throughout winter and spring; in summer and autumn they will flourish better if plunged in the pots out of doors. All changes to which they are subjected should be brought about gradually, as violent transitions from heat to cold, or *vice versâ*, are productive of the most injurious effects. The kinds marked with an asterisk, being vigorous growers, are better adapted for a wall or the pillars of a conservatory. In such situations they grow well, and their handsome foliage and drooping flowers are displayed to great advantage.

Of the Banksian Roses we may mention the Yellow and the Jaune Serin. The former is well known; the latter is larger and more double, and deeper in colour. Both thrive well in common garden-soil; they should be planted against a south or east wall, and require management in pruning to ensure a plentiful crop of flowers. About midsummer, the succulent shoots, when not wanted to cover the wall, should be cut in close, and some of the moderate shoots should be shortened at the same time; the issue will be twiggy shoots in a condition to bear flowers. For pot-culture, these roses are not the most eligible; a successful exhibitor assured me, this spring, that he had grown thirteen large plants, of which only one had flowered.

Herein, then, have we given in detail a description of Yellow Roses of all characters, suited for various purposes: surely few lovers of this flower are so circumstanced that they have not the proper situation or convenience for some, and it is hoped that these brief cultural remarks may assist in conducting them to a successful issue. When so easy of culture, who would be without Yellow Roses?

ON THE CULTIVATION OF THE STRAWBERRY IN POTS.

By Mr. G. Fleming.

Of all the hardy fruits that our gardens produce, perhaps none is more generally or more deservedly a favourite than the Strawberry, and that considerable pains should be taken to obtain very early fruit by artificial means is a natural consequence. The object of the present paper is to offer some remarks on the method of effecting this during the earlier spring months.

The plants intended for this purpose should be prepared by high cultivation during the previous summer, as it is essential to obtain strong-rooted, robust, well-ripened plants before winter. In the southern counties this is a matter of little difficulty, it being found sufficient to select the strongest young plants from the beds about the end of August, and pot them singly into 5 or 6-inch pots. But in less favourable localities, of which this is one, it is necessary to render nature greater assistance in producing plants of sufficient strength and maturity to answer the purpose desired.

In situations of this description the plants should be obtained from the first joint of the earliest runners, and to ensure their removal for potting with the slightest possible check, small pots filled with soil should be plunged under these first joints, which must be secured in their position by means of small hooks. As soon as the joints have emitted roots and leaves, the points of the runners beyond the pots, and all other runners whatever, must be cut off, so as to direct as much as possible of the parent's energy into the young plants intended for forcing. As soon as they are fairly rooted, and before they have begun to extend their roots into the surrounding soil, they should be transferred to their fruiting pots.

The size of pots used, and the number of plants in each, must depend on certain circumstances, by which every cultivator must be guided in forming a decision. Where the watering of the plants which are being forced can be vigilantly superintended, it is decidedly the best method to pot them singly into 5 or 6-inch pots. It must, however, be remembered that plants in pots of this size require watering more frequently than those in larger, and that upon due attention to their wants in this respect, in connection with a proper regulation of heat and ventilation, the size, flavour, and beauty of the fruit entirely depend. For this reason I would recommend all cultivators who, from the extent of business under hand, are prevented from giving a large share of personal attention to this matter, to use pots of a larger size with two or three plants in each. The soil should consist of two-thirds of strong turfy loam and one-third of cow-dung, with a little soot added to destroy insects. These should be thoroughly incorporated at least twelve months before they are required for use, and during the intervening winter the frozen crusts should be regularly removed and laid by themselves. By constant attention to this practice, a sufficient quantity of the compost will have been exposed to the action of the frost, and with the addition of a moderate portion of sand, sufficient to ensure free passage for the water, will be ready for use at any time.

After potting, the plants should be set (not plunged) in an open situation on a bed of ashes. They will require shading for a few days, until they are established in their new soil, after which they must be freely exposed to the sun and air, that they may make and ripen a healthy growth. During the growing season they must be abundantly supplied with water; and upon the approach of severe weather, they should be at once removed to their winter quarters. In this situation they should be freely exposed to the air by the removal of shutters, lights, or other coverings, excepting only in wet or very cold weather.

If frames with covers, either of glass or wood, can be spared for them, it will of course be preferable to any other arrangement, but when they cannot have this advantage, they may be plunged in ashes in the open ground. The beds should be of a convenient width, and hooped over with rods of willow or some other suitable material, upon which longitudinal rods must be fastened to support a tar-cloth covering. This should be of sufficient width to reach the ground on both sides, and should be fastened along the centre of the arches, to which point, when not required for use, it can be rolled up on either side. The edges of the tarpauling should be nailed to light rollers, which will facilitate the operation of covering or uncovering, and preserve the material in good order for a longer period. In gardens where a respectable, neatly finished appearance is considered indispensable, these beds may be made ornamental, at a trifling cost. The outside may be bounded by a neat stone curbing, and the frame-work for supporting the covering may be of iron rods, leaded into it. This, if properly tarred, will be a permanent job, and divested of that unsightliness which renders it necessary to conceal these, and many other gardening conveniences, in the background. It will not be out of place to mention that shelters of this kind are useful at all seasons of the year. After the earliest Strawberries are removed to the forcing pits, constructions of this kind are a sufficient protection for many common plants that have been forced, and for a variety of all but hardy plants, that during the winter have occupied the cold frames, which are soon called into requisition when spring propagating commences. They are equally useful for hardening or protecting young plants intended for bedding out, and during the summer every gardener knows the value of such places, in which to set choice greenhouse plants, as he can expose them to, or protect them from, either sun or rain. Another very common plan, but inferior to the above, is to stack the pots in the shape of a wall sloping on both sides; the pots being placed on their sides, with the leaves of course pointing outwards. The base of the stack generally measures about 3 or 4 feet through; the lower tier of pots are supported by a course of bricks, to make the work steady, and to keep the leaves out of the dirt; and the space within the line of pots is filled up with coal-ashes. Successive tiers of pots are then added, and the interior filled up with coal-ashes as the work proceeds. The breadth of the stack is gradually diminished upwards, till the bottoms of the pots on the opposite sides meet together. The top is then covered with as much ashes as will conveniently lie on it, and the whole is covered with a broad board. It is a common practice to protect these ridges, in severe weather, with dry fern; but this is objectionable on account of its untidiness, and the difficulty of removing it to admit light and air, as it is an advantage too great to be overlooked to be able to expose the plants to fine weather, if only for a few hours during the middle of the day, and, to ensure regular attention to this matter, the covering should be so arranged as to be easily applied or removed.

The general method of forcing Strawberries is to plunge them in a pit, in slight bottom-heat, and to bring them gradually forward in such a place till the fruit is set, after which they are generally removed to shelves in the vineries or pine stoves to swell and ripen them. The worst evil to be contended with in these situations is the heat of the sun against the sides of the pots, which dries the soil so quickly that the waterer finds it necessary to water beforehand, to prevent the plants suffering between-times. In consequence of this the soil becomes saturated and unwholesome, the roots are injured, and the plants become unhealthy, and have less power to resist the attacks of red spider and other insects, which always find an easy prey in plants which are disordered by any species of mismanagement. Anxious as we are to secure to the fruit and foliage the full advantage of sunlight, we feel satisfied that exposing the sides of the pots to the hot rays of the sun is the source of more failures in plant or fruit growing than many are aware of. To obviate this difficulty in the instance of Strawberries on vinery shelves, upright boards a few inches deeper than the pots should be fixed along the front edge of the shelves, by which simple means the pots will be shaded from the midday sun, while the latter will still have access to the surface of the soil; and as the back of the shelf is left unclosed, a free circulation of air round the pots will still be secured. Their general liability to be attacked by insects, and the consequent danger of communicating the pest to the vines, form a sufficient reason for keeping Strawberries out of the vineries, if possible, altogether; and as the successful early forcing of this beautiful fruit is so important a matter in nearly all gardens, it is worth while to devote pits to their especial cultivation, constructed in such a manner as is best calculated to effectually answer the desired end. The kind of pit which I would recommend for this purpose would be about 9 feet wide inside, span-roofed, running north and south; the walls above the ground should be 9 inches thick, the inside bricks being built on edge, and the outside flat in the ordinary way, thus forming a hollow wall with a cavity of 1½ inches. The space of a brick should be left open on a level with the ground under the centre of each light outside, and also immediately beneath the coping opposite the rafter on the inside, and one of these sets of holes should be secured with small gratings, to prevent the ingress of mice, with closing ventilators to exclude the cold in very severe weather. By means of these ventilators, and by drawing down or tilting the fronts of the sashes, a thorough and sufficient circulation of air will be always at command.

The side walls should be about 2 feet high, and covered with a stone coping or curbing, to which the wall-plate and rafters of light cast-iron should be leaded down. A single line of 4-inch hot-water pipes should be conducted round the pit close to the wall, on a level (or nearly so) with the inside row of ventilators, and a line of 3-inch pipes should be laid along the bottom of the pit on a level with the ground outside or thereabouts; but so arranged that the bottom or top pipes can be worked separately. The pit will contain 11 shelves, which should be 20 inches from the glass; the central one being 18 inches wide, to contain two rows of plants, and five on each side 9 inches wide. The brackets for supporting the shelves and pipes should also be of cast-iron, and leaded into the stone coping. The pit should be parted off into divisions of about 3 lights in length.

After the pit has been used for forcing Strawberries during the spring months, and the shelves are removed, it answers admirably for late Cucumbers or Melons, for the assistance of which the bottom-heat pipes are introduced; and as both these crops are grown to so much greater perfection when trained near the glass, the lower angles of the brackets should be drilled to receive the longitudinal wires upon which to train the plants.

The advantages of such a pit are its complete adaptability to useful purposes all the year round. After the cucurbitaceous crop is removed late in autumn, and the shelves reinstated, it will of course form a store pit for the strawberry plants during winter. From the position of the house the plants will derive the greatest possible amount of light during the morning and afternoon, and during the hottest part of the day the sun will fall most obliquely upon the glass, at which time also one plant will shade the pot of another, thereby preventing the bad effects of the sun upon the sides of the pots.

During the winter the plants should be very moderately supplied with water, but when it is necessary to commence forcing, the allowance of heat and water must be gradually increased, and a moderate amount of moisture kept up. During the flowering, however, the atmosphere must be kept very dry, with a night temperature of 50° to 55° till the fruit is set, after which the temperature may be raised to 60° or 65°, during which time water should be abundantly supplied, giving liquid manure or guano water about twice a week. If splendid fruit are required, the shows should be thinned as soon as they are set, leaving only four to eight of the most promising to mature themselves.

The principal enemies to be guarded against are aphides, red spider, mice, and slugs. The two first of these attack both fruit and leaves, but principally the leaves; the two last attack the fruit only, and in a most annoying manner. The mice are particularly so, as they do not eat the fruit, but only pick off the seeds, and of course spoil its appearance. To prevent the damage done by these enemies, the plants must be vigilantly watched, and, on their first appearance, effectual measures must be taken for their destruction. As a precautionary measure against the red spider, the entire surface of the brick-work inside and the hot-water pipes should be washed over with a mixture of lime and sulphur. The aphides must of course be destroyed by tobacco, and the slugs must be carefully sought for by candle-light.

REMARKS ON THE DWARFING OF FRUIT-TREES.

By Mr. Robert Errington, Oulton Park.

In former days it was the custom to attempt the dwarfing of Fruit-Trees chiefly in order to render them more ornamental, or to produce grotesques forms, to which the vulgar imparted imaginary characteristics, on account of their mere eccentricity.

Now, however, it has become absolutely necessary to systematise a dwarfing system for other purposes. In the first place, the immense increase in fruits of superior character —which in many parts of the kingdom deserve a wall—has been so great, that since walls could by no possibility be found for them, the inventive faculties of Horticulturists have been taxed severely, in order to adopt some mode of culture, which shall guarantee to them an amount of atmospheric heat superior to that of the ordinary standard, or Orchard Tree.

It has, moreover, been proved beyond all question, that a dwarfing system, when properly carried out, is highly conducive to precocity in point of fructification; it consequently leads to great economy of space—a matter of the very highest import to the cultivators of small gardens in the vicinity of our busy towns, many of whom are amongst the most ardent of our cultivators.

Again, it is of the utmost importance to persons thus situated, so to arrange their limited gardens, that a full amount of vegetable produce may not be lost sight of. This, it is well known, is accomplished in the most perfect way, by a dwarfing system in fruits; whereas, by the old plan of encouraging standards, or coarse overgrown trees, few vegetables were brought to that perfection of which they are capable; indeed I have frequently known gardens so smothered, that scarcely a well-grown cabbage could be obtained in a perfect state. Lettuces, peas, and indeed most other culinary crops, will be found "drawn," as it is termed, by practical men; and not only deteriorated in size, but in flavour and nutritious qualities.

There has in later years been a great increase in those interesting little suburban plots, termed amateurs' gardens; a great many of these are either wrought in part by the proprietor himself, or at least under his superintendence. Many of the owners of such gardens are occupied most of the day in matters of trade; and the pleasures of Horticulture are of course enjoyed with a peculiar zest when a leisure moment occurs. To such a dwarfing system of fruit-culture is invaluable, combining, as it does, the advantages before enumerated, together with little matters of manipulation of a light character, and exceedingly interesting to those who seek relief to the mind from the dull mechanical tedium of commercial affairs.

Such gardens, it is well known, are for the most part severely limited as to space; yet, by a systematic procedure in regard of fruits, it is astonishing what a collection may be compressed within the limits of one of these recreative homesteads; in fact, a very excellent miniature collection within an enclosure of a quarter of an acre.

"Little things are great to little men," according to the old saying; and these miniature matters, although it may be of a trivial character in the estimation of those who do things by wholesale, yet are conducive to the health and happiness of thousands, producing their daily quota to the gastronomic delights of the household, and feelings of a much higher character to those who "look through Nature up to Nature's God."

The ornamental character, too, of a system of dwarfed fruits, although a matter certainly second in importance to their utility, is not to be lost sight of entirely.

A little garden possessing a miniature collection of fruits and well-grown vegetables is indeed a *multum-in-parvo* affair: it shows forth at a single glance the triumph which the collective experience of many, very many, years, aided by the lights of science, has at last accomplished, and furnishes a hint even to our brethren of the plough, of what may be done by perseverance; and that it is not merely the number of acres a man possesses, but the amount of application, aided by a mind of expansive character, that signalises efforts in this way.

Whilst pointing to the benefits to be derived by carrying out such a course of culture, it ought not to be forgotten, that within the range of her Majesty's dominions at home a variety of climate occurs. People about the great Metropolis, who do care about the thrice-told tales of cool climates farther north, may and do think that too much fuss is apt to be made about warm aspects, ripening the wood, protection and all those minutiæ, which those who have gardened far north, or in localities of considerable altitude, have been compelled to pay regard to. So various, however, are the conditions in this respect, that it is next to impossible to lay down one set of rules for fruit-culture, even for Britain alone; to say nothing of British possessions across the water; for our neighbours, or dependencies in the colonies, have no doubt frequently profited by the sound advice which flows from the Horticultural press of Britain.

Having stated thus much as a preliminary introduction to some general remarks I wish to offer, I will now proceed to point out a few of the main principles, which must at all times influence proceedings in this way, be the clime what it may, capable of modification nevertheless, such modification dependent in the main on the average amount of solar light, together with the average of atmospheric humidity. Herein lies the basis of the whole argument, according to my opinion; for the question of heat appears to me as a secondary consideration.

Depth of Soil.—Although all other requisites are duly carried out in establishing fruit-trees on a strict dwarfing system, if the soil is prepared too deep, it will have a continual tendency to mar all other efforts.

Depth of root, when considerable, especially if the soil be of a generous character, is sure to produce a late root-action, and this is as sure to prove an impediment to the perfect ripening of the wood, which latter point might, in all probability, be urged as the proper groundwork of the whole affair. If any one doubt the importance of this principle, let him cast his eyes on the thorn family, and behold the vast difference in character between the pampered thorn-tree in some trenched plantation, and the short-jointed, stubby-looking tree on some elevated clayey knoll. Now I contend, the habits and mode of bearing of the thorn being as near as may be analogous to the bulk of our cultivated fruits—that the first described thorn is a fair counterpart of at least eighty per cent. of our kitchen-garden fruit-trees in Britain; whilst the other case will equally prove an illustration of what a dwarfing system can accomplish. Everybody knows the immense fertility of the thorn situated on a knoll of poor soil, and equally so the comparative barrenness and profusion of young shoots which attend the other case. To be sure, high culture here is admirably adapted to produce a good hedge; we need scarcely urge, however, that the two objects in view are as opposite as the poles; for what is so great a nuisance in a compact and neat little fruit-garden, as coarse-growing fruit-trees continually overpowering their more moderate neighbours, and threatening to monopolise the limited plot of ground to themselves? The proprietor is continually tempted, maugre the fine high-sounding titles on the neat labels, to cut them down, but the old idea of "try them another year" comes many a time to their rescue; and thus they continue a pest, the poor unfortunate proprietor continuing, with much assiduity, to prune away annually a profusion of coarse shoots, all produced to no other purpose than to exhaust soil, which might have been much better employed.

It may hereby fairly be inquired, what is a shallow soil; or rather, what that precise depth, if there be one, which suits the majority of our fruit-trees? To answer this by offering a specific depth would indeed be an arbitrary mode of settling such matters. Soils, subsoils, and sites, differ so much, as to render this unnecessary. Moreover, like the celebrated drainage question amongst our agricultural neighbours, the question of depth, if argued to a nice point, might lead to much useless controversy, for which the public has neither time nor inclination. I may nevertheless be permitted to quote my own practice, which I may without egotism be permitted to say has been exceedingly successful, extending over a course of many years. Twenty inches, then, I consider the maximum depth at which our fruits for dwarfing should be planted; indeed I have Peaches and Nectarines second to none, which have been planted a dozen years or more: these had only fifteen inches of loamy soil allowed them.

I would here respectfully point to a very common error concerning depth of prepared soils for fruit-trees. It is common with those who are well experienced in the diversity that exists in soils, as well as in the prejudicial effects which oozy or wet subsoils are liable to produce, to advise planting *above the ground level.* I have known persons in such cases still make the amount of soil *below the level* of the same depth, whereby, if elevated considerably, the whole of course constitutes a greater volume, and is a departure from the principle laid down. The measurement should, of course, take place from the apex of the mound, or at least the height it is intended to attain: in such cases it is well to take the liberty of adding two or three more inches; unless water is present at a certain level, in order to prove a counteracting power to the influence of extreme drought in hot summer.

From the question of more depth I must take the liberty of adverting to that of quality. A soil may be deep, yet poor; it may be shallow, yet rich; we must therefore learn to separate these matters. In later times so much has been said or written about the evil effects of introducing manures—especially those of the animal kind—into our fruit-borders, that it may at first sight appear a work of supererogation to moot the question. It is plain, nevertheless, that the public are not yet sufficiently informed on this head; and that even as "little strokes fell great oaks," so must repeated observations, through the medium of the press, establish ultimately a system to guide those who do not fully understand the bearing of the question.

In the more practical gardening of former days, deep trenching or digging and a liberal manuring formed in the main the practice pursued in making new plantations of fruits. However, it was very common, some thirty years since, to find a great portion of the quarters in our old kitchen-gardens overshadowed by huge old fruit-trees, giving ample evidence of over-cultivation originally. Their vegetables were of course inferior in character, and the whole garden in consequence wore an unsystematic appearance. Subsequent experience has proved that it is of more importance to attend to the mechanical character of the soil; and that the mixing of manures with the bulk of the soil had better be dispensed with, since any necessary amount of nourishment may be carried out by a system of top-dressing or mulching.

The benefits of the latter process, indeed, are but half estimated as yet.

When it is taken into consideration what a tendency mulch has to encourage surface fibres, which are well known to tend to a fructiform habit, it is somewhat astonishing that the practice is still so limited. Another point too must be observed, and that of no mean importance, viz. the great utility of surface manure, in preventing the injurious effects of sudden droughts, which not unfrequently cause trees to cast a considerable portion of their fruits.

Amongst other adjuncts of a dwarfing system, the selection of proper stocks on which to bud or graft our superior fruits, is a question of the very highest import. It is strange to think that the Quince stock, so valuable for dwarfing the Pear, has not come into more general use. Two points concur to hinder its almost universal adoption, viz. its ineligibility for producing a showy tree in a short time in the nursery, and the uncertainty that at present exists as to its thriving on any given soil. With regard to the first, it is in part a nurseryman's question. Pears grafted on the free or Pear stock, will make stout plants in half the time of those grafted on the Quince; the nurseryman therefore naturally prefers the Pear stock, for the plants appear much superior to the eye of those who do not fully understand the matter. Indeed, if the nurseryman must be compelled to work on the Quince, it is but fair that he should be permitted to charge nearly double the price for them, for not only would they require nearly double the time to make established plants, but in many cases he would have to apply peculiar dressings to his soil, to fit it for their culture.

In my opinion it is vain to plant Pears on such stocks, in soils not adapted for the Quince itself; those who are using Pear or Quince stocks, therefore, should consider the natural habits of the Quince.

One of the most essential points, as far as my experience of the Quince reaches, is to secure a permanency of moisture in the soil; without this the trees may grow, but the fruit will be liable to become mealy and insipid. Indeed similar effects are known to follow with the Pear on the free stock. I have known them crack or rift almost in pieces, through the effect of drought, on sandy or weak soils. The Quince, moreover, can hardly be too highly cultivated; and be the soil of a garden what it may, the ground can soon be rendered suitable, providing the platform mode of planting be adopted. As to providing a soil permanently moist, I suppose we must use a liberal amount of a tenacious loam in the soil, the other portion should be of very sandy old vegetable soil; such as equal parts of very old cow-manure, leaf-mould, old spent tan, and boggy soil, adding some fine sand. By this mode of procedure, I have been enabled to grow the Pear on the Quince in the very highest degree of perfection at Oulton Park, whereas the ordinary soil is by no means suitable.

Here again, in order to secure a regular moisture, mulching should be had recourse to; the Quince moreover makes abundance of surface fibres, and these revel beneath a coating of rotting surface manure.

The remarks here offered concerning the Quince apply in a considerable degree to the Paradise stock for apples. The Paradise, however, will thrive in any good sound loam, and this may be slightly manured for them, or at least some half-decayed vegetable matter may be blended with the soil. These, too, should be mulched annually, in order to carry out the objects before explained.

With regard to plums, most of the stocks used by our nurserymen are of too gross a habit for a dwarfing system.

What is called the "Brussels," we believe, is an exceedingly gross stock; that termed the Muscle or Mussel stock is, we believe, more moderate in growth, and would answer better.

In the question of stocks, however, much has to be learned, and many trials ought to be at once instituted by some public body, such as the Horticultural Society of London, in order to set the matter at rest for ever. About five years would suffice to throw all necessary light on the subject, and the trials should embrace everything likely—especially stocks of a hardy character, and which thrive in their own native ordinary soils. For instance, the black-thorn or sloe; why may not this answer for the plum on a dwarfing system?

I would now advert to what I must term the great mistake of former days in regard of trained fruits. Everything was to be carried out by peculiar modes of training; hence we had, for a series of years, a host of systems, so termed: in addition, too, great niceties in the pruning art were introduced, and shown forth in many a tempting diagram, tempting I mean to those who were still merely scanning the surface of the affair. At last a more comprehensive view of the subject began to be taken, and pruning and training fell into a secondary position.

Limitation of branch was now supposed to require a corresponding amount of limitation at the root, and from that period may be dated a sound reform in fruit-culture. The whole matter has now taken what I conceive to be a healthful tone, and I have little doubt that, during the next seven years, most of the gardens in the kingdom will present a new and much improved aspect.

In all cases of dwarfing fruit-trees, it is of much importance to keep the various kinds classified, in the mind's eye. Thus, one section depend almost entirely on the old spur for their fructiferous habits; another, almost entirely on that of the annual wood; whilst not a few depend on a combination of both characters of wood. These things should not be lost sight of, as, whatever the root-culture may be, the natural habits of the kind in question should be carefully borne in mind. As a general maxim, it is well not to allow the mind to be too much biassed by any set plan (or system, to use a dignified title), but to combine such wherever an eligible opportunity presents itself, reserving the chance of returning to either whenever the age, condition, or circumstances of the kind render such a course eligible. Thus a Pear, in its earlier stages, may be brought to bear on natural spurs alone; after a few years, however, most of the spurs towards the centre of the tree will become barren, in spite of cleverly devised pruning systems, and then it will be found good policy to change, in part, the tactics, and to commence tying down those young shoots on which nature has set the stamp of early fructification, evinced by a peculiarly short-jointed character, and by turning brown betimes, together with an early cessation from growth, as compared with what is commonly termed watery wood. These are of course mere technicalities, and it is to be regretted that more popular terms do not exist by which to express them; the public mind, however, is fast ripening in these respects, and the day is at hand, in the which a due conception of such terms will not be confined to mere gardeners; our horticultural press, taking the form of the times, will shortly render all these things perfectly familiar, even to the inhabitants of our busy commercial towns.

ON THE CULTURE OF THE RAMONTCHI, TOMI-TOMI, AND OTHER SPECIES OF FLACOURTIA AS FRUIT-TREES.

The Ramontchi, or Madagascar Plum-tree, is the *Flacourtia Ramontchi* of our Botanical Catalogues, and a native of Madagascar and the neighbouring Islands, where it grows in great abundance, and is called by the natives Ramontchi; but as the fruit when ripe bears so great a resemblance to our purple plum, Europeans generally term it the Madagascar Plum-tree. The plant was introduced to British Collections in 1775, but its cultivation as a fruiting plant has hitherto been too little regarded to test its value and quality; indeed it has been almost lost to this country till within the last few years, and even now is seldom seen, and almost unknown except by name. It is associated with other fruit-bearing genera, as Roumea and Oncoba, &c., which with many others form a Natural Order, called *Flacourtiaceæ*, or Bixads in Lindley's "Vegetable Kingdom."

In its native country it forms a large spreading shrub, growing about 10 feet high. The *stems* and *branches* are armed with numerous long sharp-pointed thorns. The *leaves* are alternate, simple, feather-nerved. *Peduncles* axillary, many-flowered. *Flowers* small and inconspicuous, diœcious from abortion, apetalous. *Stamineous flowers*, stamens numerous, densely crowded upon the hemispherical receptacle, and glandless at the base; *anthers* yellow. *Pistilline ones, calyx* four to five-cleft, deciduous. *Sepals* whitish or cream-colour. *Stigmas* four to nine, each furnished with one longitudinal furrow above. *Fruit* baccate, and indehiscent, growing to the size and shape of a small plum, green when young, and red when ripening, changing as it advances in ripeness, until when fully matured it becomes of a deep purple-violet. The *skin* is thin, and the flesh of a beautiful transparent red, resembling jelly, but about the consistence of that of our common Orleans plums; sweet, but leaving a sharpness in the mouth. In the middle are a dozen or fourteen small bony seeds or kernels, which are of a bitterish taste, not much unlike the kernel of a ripened Apricot; the seeds are nearly of the size and shape of Apple pippins, and are covered with a brown tender skin or shell.

This fruit is highly esteemed and universally eaten by the natives, and is also freely used by Europeans both in tarts, preserves and dessert. The crops are abundant, and the fruiting season protracted, on account of the plants continuing to flower for several months. The bushes are also very ornamental, and although thorny, are much cultivated.

The Tomi-tomi, or Unarmed Flacourtia is the *Flacourtia inermis* of authors, and a native of the Molucca Islands, where it is very extensively cultivated for the sake of its fruit. It forms a *tree* 30 or 40 feet high, without spines. The *leaves* are elliptical, crenately serrated, and shining. The *racemes* are axillary and short; the *flowers* are hermaphrodite, pale yellowish-white. *Stamens* twenty to thirty. *Style* five-cleft *Berries* reddish-purple when ripe, with a transparent red flesh, and pleasant but acid flavour. It continues in flower and fruit nearly the whole of the year, and was introduced to this country in 1814.

The Pedda-Canrew, the *Flacourtia sapida*, is also another very good fruit-bearing kind. It is a native of various parts of the East Indies, growing abundantly on mountains and in stony places, forming a spreading thorny bush 12 or 14 feet high. The fruit are red, and produced in bunches from the axils of the leaves, growing to the size of red currants, to which both in flavour and in appearance they bear some resemblance. They are much eaten by the natives, especially as preserves and in tarts, and are sold abundantly in the markets. The plant was introduced to this country in 1800, but is little known.

The CANREW (*Flacourtia sepiaria*) is also a native of the East Indies, and being dwarf and very thorny, it is used as a hedge plant in the same manner as our hawthorn, and which purpose it answers admirably. The bush grows compact, and seldom exceeds 6 feet in height. The leaves are obovate, oblong, and repandly serrated. The fruit are small, red, of a pleasant flavour, and are sold in the public markets under the name of Canrew. The plant was introduced to this country in 1820. Besides the above, several other species bear eatable fruit, which are held in reputation in their native countries. Amongst these might be mentioned the

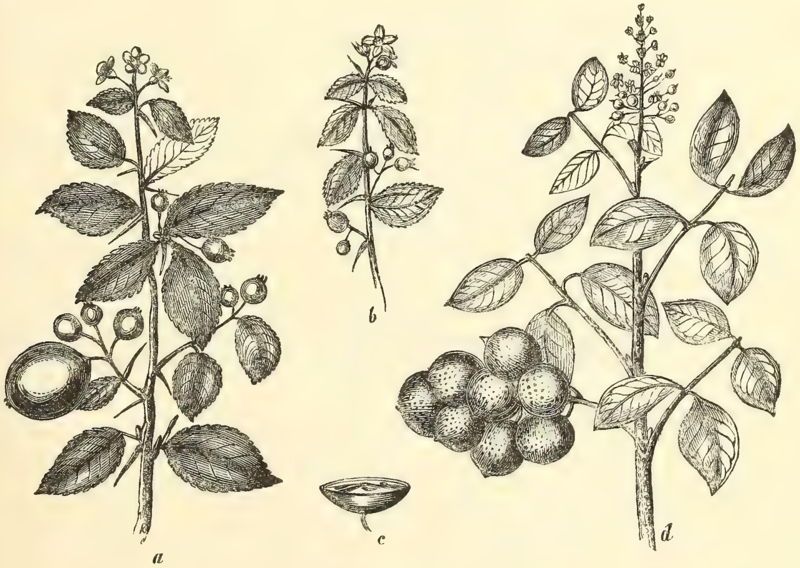
FLACOURTIA RHAMNOIDES, a half-hardy shrub, from the Cape of Good Hope, growing about 4 feet in height, and producing abundance of small, ovate, red berries, of a very good flavour when ripe.

The FLACOURTIA CATAPHRACTA. A small thorny bush, reaching 7 or 8 feet in height, and bearing fruit about the size, colour, and taste of our Cluster or Whortle berry (*Vaccinium Myrtillus, Vitis Idœa*). It is a native of the East Indies, and was introduced to Britain in 1804.

FLACOURTIA PRUNIFOLIA. A native of New Granada, its fruit are small in size, but are said to be of a very pleasant flavour. With the exception of *F. rhamnoides* all the species require a good stove heat, and very similar treatment.

In the selection and preparation of soil in which to grow them, it must not be forgotten that in their native countries all the species are found growing wild in mountainous stony districts, where the soil is light and somewhat shallow. If the plants therefore are to be grown in pots or tubs, a mixture of two parts light sandy loam, and one part peat, sand, and rotten manure, is the best composition, with abundance of drainage; but if they are turned out into a prepared border, any light rich turfy loam, rendered open by an addition of sand, will answer every purpose.

Nothing peculiar is requisite in their treatment; when in vigorous growth or fruiting, water with weak liquid manure made from sheep's droppings, or a very small portion of guano; give air liberally, and keep moderately dry in winter. Propagation is effected by cuttings.



DESCRIPTION OF THE WOODCUT.

a, Flacourtia Ramontchi, or Madagascar Plum.
b, Flacourtia sapida, or Pedda Canrew.
c, Fruit of Melicocca bijuga, or Honey-berry cut open.
d, Melicocca bijuga, showing the inflorescence and young fruit.

CULTURE OF THE WEST INDIAN HONEY-BERRIES AS FRUIT TREES.

The common Honey-berry of the West Indies is the fruit of *Melicocca bijuga* of our Botanical Catalogues, and is identical with the *M. bijugata* of Jacq. Amer., cviii., t. 72, and the *M. carpoidea* of Juss. Mem. Mus. iii., p. 187. In the time of Patrick Browne it was called the Genip tree, but it is now more generally known as the Honey-berry and Sweet Bullace. At Curaçoa the Spaniards call it *monos*, and cultivate it under that name to a great extent. It was introduced to this country in 1778, and is associated by Dr. Lindley, in his admirable "Vegetable Kingdom," with the natural order *Sapindaceæ*, or Soap-worts.

In its native habitats it forms a spreading bush 18 or 20 feet in height. The *leaves* are pinnated; *leaflets* four, large, and yellowish-green. The *rachis* winged. *Racemes* terminal and axillary, simple, spike-formed. *Flowers* octandrous, of four petals, small, yellowish-white, the stamineous more yellow than the pistilline ones. *Fruit* a drupe, one-seeded from abortion, growing to the size of a Bullace Plum, to which it bears a considerable resemblance, jet black when ripe, sweet, and possessing a very pleasant flavour.

It grows wild in the Antilles, and New Spain in the province of Caraccas, it is however cultivated extensively in the West Indies, Brazil, and other parts of South America. The trees are abundant bearers, and the fruit are used for the same purposes as our plums, but if eaten in too great quantities, are said to produce salivation, and are therefore used in medicine for this purpose.

The East India Honey-berry, a native of Timor and Ceylon is the produce of a different species to that producing in the West Indies, and is called by Botanists, Melicocca trijuga, from the circumstances of its leaflets being disposed in three pairs, instead of two as in the last. It is the Schleichera trijuga of "Willd. Spec.," and Scytalia trijuga of "Roxburgh's MSS."

It forms a small *tree* 20 feet or more high. *Leaves* pinnated, leaflets in three pairs, oblong, obovate, obtuse. *Racemes* axillary, elongated. *Flowers* small, white. *Calyx* from four to six parted. *Petals* four to six, or from abortion apetalous; *disk* occupying the bottom of the calyx. *Stamens* eight, inserted between the margin of the disk and the ovary. *Style* crowned by a two or three lobed stigma. *Ovary* two or three celled. *Fruit* round, two or three celled, or from abortion one celled. *Seeds* three, or from abortion, one, enwrapped in a fleshy substance. The fruit of this, is when ripe, black and of a pleasant flavour.

The Olive-shaped Honey-berry (*Melicocca olivæformis*), is a native of New Grenada, and Turbaca. The *shrub* grows about 16 feet high; the leaves consist of two pairs of large pinnæ, which are elliptical, acute, and coriaceous. *Rachis* naked. *Peduncles* terminal, branched. The fruit grows to the size of an olive, and is of the same shape. When ripe it becomes black, and like the other two, is sweet with a pleasant flavour. The plant was introduced to Britain in 1818.

In cultivation, treat exactly in the same manner as the stove species of Flacourtia, and there is little doubt but profuse fruitfulness will amply repay the cultivator. Cuttings grow planted in pots of sand, and placed under a handglass in a lively heat.

MISCELLANEOUS.

New and Rare Plants in Flower. *Plumbago Larpentæ.* A specimen of this beautiful new Leadwort, exhibited at the Botanical Society's exhibition on the 16th of last May, created a momentary feeling of disappointment, in consequence of the tender, debilitated aspect it presented, in conjunction with a correspondingly meagre display of inflorescence, which (considering the size of the plant exhibited) was inferior, both in quantity and quality; the specimen, as a whole, being far from a realisation of the expectations that had been formed of it from the time of its first introduction to public notice by Mr. Eyles (then Sir George Larpent's Gardener at Roehampton), at one of the Horticultural Society's Meetings at Chiswick, in 1847, to its subsequent diffusion through the medium of Messrs. Knight and Perry, of the Exotic Nursery, Chelsea. The delicate-looking plant above alluded to, had apparently been grown in a higher temperature, or, (which will prove just as detrimental to the successful culture of this charming Plumbago) had experienced, probably, a greater amount of moisture, and consequent excitement in winter, than is consonant with its well-doing: but whatever kind of treatment had been adopted to induce so tender and succulent an appearance in a plant generally considered to be half-hardy and robust, it must, obviously, have been very dissimilar to the management which, in the case of a gigantic specimen we recently noticed in the nursery of Messrs. Knight and Perry, had resulted so advantageously. This fine specimen, we were informed, had been altogether managed as a deciduous, cold-greenhouse plant, receiving, when defoliation occurred towards winter, a similar amount of drought and dormancy to that usually accorded to the Fuchsia. In spring, when indication of excitement appears, the Plumbago Larpentæ should immediately be shifted into, or renewed with, a free compost of loam and peat with a little coarse sand, and abundance of potsherds, lumps of charcoal, &c., to secure an effective bottom drainage; and further to promote porosity in the mass, crushed bones, small pebbles or potsherds, should be freely commingled with the rooting medium. A warm greenhouse might not be an objectionable place to induce it to start more freely into growth, although the plant already mentioned, in Messrs. Knight and Perry's collection, has made abundance of shoots for forming a good specimen, and which are all the *sturdier* for being *exclusively* cultivated in the temperature of a cool, airy, greenhouse. Water must be sparingly given until the shoots are an inch or two in length, when moisture must henceforth be liberally supplied; the shoots themselves being timely thinned if over numerous, and duly stopped if non-abundant, and, as they advance in growth, rendered prostrate or directed horizontally by means of pegging and tying, that the specimen may be filled out over the pot-rims, and well-balanced in other respects. When about to expand its beautifully tinted, intensely azure blossoms, an occasional draught of mild, highly-clarified, and diluted liquid manure beverage, will greatly invigorate the energies of the plant, and induce the development of finer flowers, which, even under a condition of mediocrity, form a rich contrast with the refreshing verdure of the foliage. We soon hope to learn something of the adaptation of this valuable addition to our greenhouses, for the summer and autumn decoration of the flower-garden; a purpose for which, from its semi-frutescent half-hardy character, it may be considered admirably adapted. A good specimen of this Plumbago we also noticed recently at Messrs. Henderson's Nursery, Pineapple Place, under similar circumstances of cultivation to those above referred to at the Exotic Nursery, Chelsea.

Gloxinia leuconerva. This Gloxinia is chiefly remarkable for its large, conspicuously white-veined leaves, and the propensity it has to flower abundantly with a remarkable succession of blossoms. The flowers possess but little claim to intrinsic beauty, compared with the many brilliant coloured varieties now in cultivation, although the general appearance of the plant renders it an interesting desideratum to every collection. The habit is rather peculiar; the somewhat curious, luxuriant foliage, depending over the sides of the pot more than is generally the case in Gloxinias, whilst the flowers are produced in a compact central group, on nearly erect peduncles, and in such profusion that we were enabled to enumerate upwards of fifty blossoms, some of which, however, were past their prime, and around the base of these, to succeed them, were a multitude of young flowers protruding.

A good plant of this Gloxinia we noticed in the collection of S. Rucker, Esq., Wandsworth; but our present observations refer more particularly to a specimen we recently saw in the stove of Messrs. Knight and Perry, Chelsea.

In the nursery of the above-mentioned gentlemen, although we were too late to enjoy the superb display of "rich and rare" American Rhododendrons and Azaleas that had been in full beauty a short time previous, we were, nevertheless, much gratified by the inspection of several very distinct and beautiful late-flowering kinds, which, independent of the merit of intrinsic beauty (which they possessed in a high degree), we deem invaluable on late-blooming grounds alone; and fully concur in the views expressed to us by Messrs. Knight and Perry, that in the disposition of these gorgeous ornaments, either as isolated groups, single specimens, or in broad rich masses in the shrubbery or on the lawn, greater attention should be paid, in the generality of cases, to the classification and blending of their colours, and especially to the more effectual arrangement of the late blooming sorts. Amongst a great many novelties, we select for especial notice the following few which remained in bloom when we visited the Exotic Nursery late in June.

Rhododendron Azaleoides fragrans and *fragrans* *major*. These charming rosebays are both profuse bloomers, capital trussers, exquisitely fragrant, as the honeysuckle or the rose, and admirably suited for winter forcing as well as grouping. The chief distinction resides in the size of the flowers, which, as regards colour, are pinkish white, or occasionally of a lilac or light purplish hue.

R. Azaleoides Cartonianum. Another beautiful free-blooming kind, with fine heads of flowers, in the colour of which red and bluish purple appear to predominate.

R. oculatum. This is one of the light flowering sorts, a good trusser, the upper limb of the corolla of a golden hue, and thickly studded with chocolate coloured markings.

R. guttatum. This is a superb, robust growing Rhododendron, possessing all the good qualities of the last mentioned, with larger and more conspicuous flowers, supported on longer peduncles, and the petal spots more ruddy than R. oculatum. The foliage too, is distinct and good, and from the vigorous habit of the specimens shown to us, this kind seems well adapted for forming into standards, than which, when a good broad head is obtained and in full bloom, nothing can be more truly noble and rich.

R. multimaculatum. A distinct and very hardy, robust growing, light flowering sort, the upper portion of the corolla extensively bespotted. There is also an interesting semi-double variety of this fine rosebay.

R. ponticum atropurpureum. The finest late-flowering dark variety we are acquainted with. It is a most profuse bloomer, and the colour of the flowers, as the name imports, is of a deeper and richer purple than the common *R. ponticum.* It is altogether a most desirable kind, and from its propensity to bloom so late in the season, is deserving of extensive introduction into every collection of hardy American plants.

Those who take interest in HARDY ORNAMENTAL TREES AND SHRUBS, would do well to pay the Exotic Nurseries of Chelsea and at Battersea a visit; for at the latter, especially, Messrs. Knight and Perry have assembled in a short time a vast collection of interesting novelties and specimens, in the way of ornamental trees and shrubs.

The Arboretum at Bicton, which is considered one of the richest and most extensive in Europe, has been mainly supplied with its rarest subjects from Messrs. Knight and Perry's establishments, from which we have only space here to enumerate a few of those to which our attention was directed; nor is this material, as we contemplate embracing an early opportunity of introducing a formal article on this—one of the most interesting, and yet neglected departments of Gardening.

TILIA MISSISSIPIENSIS. This extraordinary foliaged lime we noticed in the Battersea Nursery, with leaves 14 inches in diameter upon plants only 2 or 3 feet high!

In the Chelsea Nursery we observed an extensive assortment of hardy ornamental Oaks, some of which were exceedingly interesting and distinct, including a fine plant of the rare *Quercus Japonica,* or *Q. glabra.* Also *Berberis Fortuni.*

Ligustrum Japonica, Euonymus fimbriata.—A very handsome growing shrub. *Polygonum vacinafolia*—admirably adapted for planting extensively among rockwork.

Panax horrida, Osteosmales ferruginea.

Daphne Japonica variegata. The name of which is scarcely expressive of the appearance of the plant, as much of the foliage is quite white, and many other equally rare and valuable hardy ornamental plants.

Escallonia macrantha. This ornamental Escalloniad was produced at the June exhibition of the Horticultural Society, by Messrs. Veitch of Exeter, who have already been the fortunate introducers of so many rare plants in the hardy ornamental line. The plant exhibited being pot-grown, did not present its true luxuriant character to the extent that a cut branch from a specimen which had thrice experienced Devonshire winters in their nursery at Exeter, did. Messrs. Veitch consider it will prove quite as hardy in North Britain as it is found to be in the south; and should their expectations be ultimately realised, such a fine evergreen as this, will be an interesting addition to collections, either as a single specimen for the Arboretum, or on the lawn, or for planting *en masse* in broad shrubbery foregrounds. Altogether, it is a shrub of considerable beauty; the inflorescence forming handsome terminal corymbs of large, tubular, ruby-coloured or purplish crimson flowers, which contrast strikingly with the rich verdure of its foliage.

Introduced through their own collectors from Patagonia, by the above-mentioned enterprising gentlemen. Also from Messrs. Veitch, at the Chiswick Meeting in June.

Lisianthus pulcher. A promising new plant, with bright scarlet tubular florescence, but neither sufficiently grown or flowered, to enable any just appreciation of its merits or demerits to be arrived at. Also, a new species of Ruellia with sub-Gloxinia-like, bluish flowers, to which similar observations are applicable.

Cattleya marginata. Magnificent and beautiful as are many of the Cattleyas already in our collections of *Orchideæ*, the present surpassingly beautiful one is unequalled in the richness of its labellum. It certainly resembles *C. superba,* but so far surpasses that really fine species in exquisite beauty, that it seems almost unjust to institute a comparison of their respective merits. Although the plant exhibited was small, and evidently not in a very luxuriant state, it nevertheless possessed sufficient attractions to enable an opinion to be formed of what may be ultimately expected of it under cultivation; and especially as such fine objects as *C. Mossiæ,* bearing a score or more of its noble blossoms, are not now uncommon. Its sepals and petals are of a deep rosy crimson, of greater breadth than *Cattleya superba,* whilst the lip of the flower is intensely blotted with crimson-violet or stained with the richest dark maroon colour. This superb epiphyte is from Brazil, and was produced at the Horticultural Society's Chiswick Meeting in June, by the Messrs. Loddiges' of Hackney.

Odontoglossum, spe. nov. A handsome new species in flower was exhibited at the above floral fete by Mr. Mylam, gardener to S. Rucker, Esq., Wandsworth. The ground-colour of the inflorescence is pale green, deeply marked with a rich orange-brown, the same colours extending over the labellum nearly to its base, where it becomes white. Also from the same gentleman's matchless collection of orchids, the new *Phalœnopsis roseum;* a pretty and interesting species of this beautiful genus, with somewhat clouded pink petals, and a rosy-crimson lip ; the central portion of the flower being finely delineated with yellowish lines or spots.

Those who are in the habit of regularly attending the great *réunions* of Flora at Chiswick, and the Royal Botanic Gardens, Regent's Park, cannot have failed noticing (notwithstanding the admirable culture and dazzling array of beauty, which at the moment all but exclusively arrests the attention), the somewhat clumpish monotony of *form* which predominates in the training of Pelargoniums, &c., for exhibition specimens.

It may be considered an incontrovertible axiom in the taste displayed in such matters as Specimen Plant culture, that variety of shape and outline in the specimen itself is just as great a desideratum as variety of colour in the flowers, and would be just as acceptable to the flower-loving public who, although they cannot at all times see these things for themselves, are not the less ready to appreciate and do justice to improvements when suggested and adopted by those accustomed to observe more closely such matters. We are aware that an opinion is prevalent with cultivators of the Pelargonium especially, that the present general method of growing them is of all others the one most adapted for producing remarkably fine trusses of large flowers; and doubtless this opinion is, to a great extent, substantiated by many practical realisations of its correctness; still, admitting this to be the case, we firmly believe that if the interest at present manifested in these public exhibitions of plants is to be maintained as it should be maintained, something must be done to compensate for the existing absence of *novelty* in a *more conspicuous and decisive manner*, than the mere introduction of a new plant to public notice, howsoever intrinsically attractive it may be. And where a more extensive field for experiment than that at present open, with respect to the training and formation of plants into specimens ?

These observations are intended to apply to exhibition-plants generally, although they more immediately refer to Pelargoniums and plants usually grown upon trellises. As regards the former, we have been led to make these remarks from several opportunities we have been favoured with during the present season, of watching the progress of some pyramidically-grown specimens in the Royal Botanic Society's great conservatory, in the Regent's Park. These we consider to be "a step in the right direction," and to sufficiently indicate that pyramid Pelargoniums six or more feet in height, and a yard or more in diameter, uniformly clothed from the base to the apex with healthy foliage and flowers (without the conspicuous appearance of artificial props) are obtainable, although the flowers in this instance, it must be confessed, are somewhat smaller than we could desire to see them; which, however, we strongly suspect may be remedied by the judicious application of liquid stimulants when once the flower-buds are apparent.

One of the specimens alluded to (if we remember rightly, named Prince Albert), is a most successful instance of what may be accomplished in Pelargonium training, being 5 or 6 feet high and a yard through, composing a compact conical mass of short branches, and good foliage on all sides to the rim of the pot—thus presenting a greater extent of surface than usual, in addition to variety of form, over which trusses of flowers are plentifully enough distributed ; but, as before hinted at, inferior in size to what a florist would have them to be ; which, we repeat, we believe may be remedied, although we are not so sure that the flower-loving public are so over-fastidious as not to be prepared to make a slight sacrifice in this respect, when additional variety and beauty of form is the compensation for the defect, if it be one. From a minute inspection of this specimen in the conservatory of the Royal Botanic Society, we infer that the object of forming it into a pyramidical shape, has mainly been attained by the selection of a sturdy young plant, and at once inserting it into a pot of large dimensions, at the same time closely stopping it back, to induce the protrusion of vigorous shoots, as near to the base of the plant as possible ; which to have preserved in a horizontal direction, pegging them down pretty closely to the surface of the pot, must have been resorted to ; whilst one of the most vigorous shoots appears to have been selected from stage to stage (as a repetition of the stopping process became requisite,) for training perpendicularly to form the main stem, supported by a stout stake quite concealed in the centre of the specimen when fully grown. A sufficiency of laterals would of course be produced to form the pyramid, as the natural result of pinching back the more vigorous shoots, and these during the increasing height of the specimen, appear to have been induced to grow with some degree of horizontal regularity, by tying them in position to a few flower-sticks inserted for the purpose, until such time as the branches situate lower down become sufficiently rigid to admit of the uppermost shoots being trained out, by tying from branch to branch, instead of employing flower-sticks for the purpose. In the absence of precise information, we may be rather incorrect in some of the above-given details, but the result is certainly pregnant with promise of further improvement; and it will be obvious that the adoption of some such treatment we have been attempting to describe, is indispensable in the formation of pyramidical specimens of Pelargoniums, which although we by no means desire to be understood as *altogether* undervaluing the present method of training (we rather complain of the *exclusive* preference given to it), are admirably adapted in that form for the decoration of large houses like the Royal Botanic Society's, and we opine there can scarcely be a difference of opinion as to the superior effect a few such specimens would produce, intermingled with the monotonously beautiful groups—of course we refer to the *outline* of the specimens only—which adorn the Pelargonium stages of our great Metropolitan exhibitions. The

"Fancy" Sorts, and such profuse bloomers as Ne Plus Ultra, Unique, and doubtless some of the better Scarlets, are well adapted for the purpose—the latter especially, *if well carried out*, we think would lend an additional charm of brilliancy to that which Pelargonium exhibitions already so perminently possess.

Seeman's Botanical Notes. Leaving Panama, we spent several days at Taboga, the most delightful island in the bay. In its centre rises a hill about 1000 feet high, cultivated with useful fruit and vegetables nearly to the summit, sending down little streams to the valley, where between palms and tamarind trees, the habitations of natives are almost hid. Walking among the Mammee and Orange-groves, seeing the Nispero, the Alligator-pear, and the Mango-trees, loaded with fruit, or admiring the extensive Pine-apple plantations on the side of the stony hills, fancy transports the stranger into the garden of the Hesperides; but, however gratifying to the sense such a place appears, a collector is little benefited by it; and I was, therefore, glad to exchange Taboga for the coast of Veraguas, a more profitable field for botanical investigation.

I disembarked at Remedios, a large village, and the first thing we saw there, were some men making ropes. The cordage generally used in the Isthmus is obtained from different plants belonging to *Columniferæ*. The best and whitest ropes are made of the fibre of "Corteza" (*Apeiba Ptoumo*, Aubl.) A brownish looking rope easily affected by damp (probably because the tree it is taken from contains much saline principle) is manufactured of "*Magagna de playa*" (*Hibiscus arboreus*); and a third kind is obtained from "*Barrigon*," an undescribed tree, which I have called *Bombax Barrigon*. The *Xylopia sericea*, St. Hil., also yields a fibre fit to be made into ropes. It is on that account named "*Malaguetto Nembra*" by the natives, to distinguish it from *Malaguetto macho*, (*Xylopia grandiflora*, St. Hil.,) which is destitute of such a quality.

From Remedios our road led through an immense virgin-forest, the Montana de Corcha. It was here that we discovered a new species of *Pentagonia*, with leaves like that of *P. pinnatifida*, so that we know three species of this interesting genus. They are equally distributed over the Isthmus. *P. pinnatifida* occupies the province of Darien; *P. macrophylla*, Benth., that of Panama; while *P. Tinagita*, as this third species might be called, is indigenous to Veraguas. The native name "*Tinagita*," is taken from the fruit, which resembles the water-jars (tinagas) used in the country.

Mr. Bentham in establishing the genus, placed it amongst *Rondeletiæ*, supposing a bilocular *capsule* to be its fruit; but as *Pentagonia* has a bilocular *berry*, the inside of which is eatable, the *Gardeniæ* is the tribe of which it must be considered a member. The *Pentagonias* growing in shady places on the banks of rivers and rivulets, are small trees, (*arbusculæ*), from 10 to 14 feet high, with leaves generally from 1 to 3 feet long, by 6 to 10 inches in diameter, red bracts, calyces, and corollas, and berries eatable, like those of the rest of the tribe—the *Genipas*, *Posoquerias*, &c.

A tree whose bark is employed against fever and tooth-ache, and known by the Indian appellation of "*Corpachi*," is frequently met with in the woods. I take it to be *Croton Pseudo-China*.

We reached the town of David on the 14th of February, and proceeded next day to Boqueti, a farm situated on the volcano of Chiriqui, 4000 feet above the level of the sea, from whence I made excursions in the neighbourhood, of which the collections transmitted are the produce. Although I had visited the place last year, I found now a number of plants unknown to me, and by a longer stay, a great many more might be obtained.

The volcano of Chiriqui, the most elevated part of the Isthmus of Panama, is about 7000 feet high, and presents a vegetation similar to that of the highlands of Mexico. The Oak and Elder are predominant. The genera Salvia, Lopezia, Rubus, Fuchsia, Centradenia, Ageratum, Conostegia, Lupinus, Hypericum, Freziera, Galium, Equisetum, Euphorbia, Adiantum, Begonia, Clematis, Verbena, Inga, Solanum, Rhopala, &c, are represented by one or more species. There are also several genera apparently new. One belonging to *Eccremocarpeæ*, has an inflorescence like that of *Castilleja vulgaris*. A second, a *Rubiaceæ*, has remarkably long leaves, from 1 to 2 feet long, and bears greenish flowers. The two *Vaccineæ* found here, do not seem to be described. One is a small tree with a rose-coloured raceme. The other approaches *Macleania*, but the calyx is smooth.

A tree very common in these regions, vernacularly termed "*Saumerio*," produces a resin that is used in churches as incense. To obtain it, the tree is felled, and when in a state of decay the balsam is found collected in the branches—the stem itself does not contain any. A *Rondeletia* growing here to the height of 18 feet, we found to have a bark that might be substituted for *Cascarilla*. It is very bitter; but the taste does not communicate itself so quick, as is the case with Cinchona bark.—*Hook. Jour. of Bot.*, p. 185.

Tomato tree. This valuable plant forms a shrub of a moderate height, the leaves are large, broad, heart-shaped, downy, and emit a very heavy unpleasant smell. As a species, it is nearly allied to Solanum Betaceum, if it be not identical with it. The fruit is the size and form of a pigeon's egg, of a rich brownish red colour, with a purplish subacid pulp, very agreeable to the taste.

Vegetation in Ceylon. Although many of the genera found in the upland regions of Ceylon are such as are common in Europe, yet none of the Ceylon species are identical with European ones; indeed, there is not to be found growing really wild in the island, a single species exactly the same as any European one; there are, however, a few which have become more or less naturalised, having been introduced along with garden and other seeds. They are the common Sow Thistle (*Sonchus oleraceus*), the common Chickweed (*Stellaria media*), the Mouse-ear Chickweed (*Cerastium vulgatum*), the Corn Spurry (*Spergula arvensis*), and the annual Meadow Grass (*Poa annua*). All these, with the exception of the first, which is much more general, are confined to the plain of Neweria-Ellia. In all countries, plants which are introduced from others, and find a congenial soil and climate, and which produce their seeds in profusion, and of a nature to be easily blown or carried about from place to place, are sure to naturalise themselves, and often, in the course of a few years, are not to be distinguished from those which are really original denizens of the clime. Besides those from Europe just enumerated, there are many other natives of distant tropical countries which are now rapidly spreading themselves on the island; and, as it is of the utmost importance to distinguish them from those that are truly natives, I shall here enumerate all those species of which I possess sufficient evidence to establish their exotic origin, and mention the countries from which they have been brought.

The two species of Prickly Pear (*Opuntia*) which are now so common in dry sandy localities in the low country, are natives of the tropical parts of the continent of America, as, indeed, the whole of the Cactus tribe is. The beautiful rose-coloured Periwinkle (*Vinca rosea*), which has so completely overrun the cinamon gardens at Colombo, and other similar localities, is a native of the island of Madagascar, though it has now perfectly established itself in nearly all tropical countries. The climbing Allamanda cathartica, with its dark green leaves, and golden bell-shaped blossoms, is a native of the Guianas, and was no doubt introduced by the Dutch. The Lantanas, which are to be met with almost every where in bushy places and in hedges, are natives of the West Indies; and such also is the case with the yellow-flowered Turnea ulmifolia, which is common by roadsides about Colombo. The Cape Gooseberry (*Physalis peruviana*), now so common about Rambodde and Newera-Ellia, is a native of the mountains of Peru. The Four o'Clock plant (*Mirabilis jalapa*), common about Candy, is a native of Mexico and the West Indies; and the Ipecacuanha plant, as it is erroneously called (*Asclepias curassavica*), with its orange blossoms, and seeds with long silky tails, is a South American. Most of these must have been long established before the English took possession of the country; but the following are well-known to have escaped from the botanical gardens of Colombo or Peradenia, during the last twenty-five years. The small white-flowered Passiflora fœtida, now so common a weed everywhere, is a native of the West Indies and Brazil, and was only introduced to the island by Mr. Moon, so short a time ago as 1824. Two species of Crotalaria—C. Bronnei, a native of Jamaica, and C. incana, a native of the Cape of Good Hope; the Mexican Coreopsis-like Cosmos cendalus; the Peruvian blue-flowered Nidandra physiliodes; and the South American sensitive plant (*Mimosa pudica*), are now not only common weeds about Peradenia and Kandy, but are fast extending themselves in all directions; the first-mentioned species having now nearly reached as far as Rambodde on the Newera-Ellia road. Brucea sumatrana, a shrubby native of the Eastern islands, and an escape from the Peradenia Gardens, now forms part of the low jungle on the neighbouring Hantane range, and Buddlea madagascarensis, a native of Madagascar, and two small kinds of Passionflower (*P. suberosa* and *glauca*), both natives of the West Indies, are fast following. Ageratum conyzoides, every where a common weed, and one of the greatest pests of the coffee planter, is of American origin, though now thoroughly naturalised in all tropical countries.

NEW AND BEAUTIFUL PLANTS FIGURED IN THE BOTANICAL PERIODICALS.

Asystasia Scandens. *Climbing Asystasia.* A remarkable African climbing *Acanthaceous* plant, introduced to our stoves by Lord Derby, through the instrumentality of Mr. Whitfield. It flowers readily, and remains a long time in blossom. Its habit is climbing, the flowers are produced in terminal racemes, and are of a pale cream colour, tinged with blush. The plant is a native of Sierra-Leone, and requires to be grown in a hot and moist atmosphere. A mixture of loam and peat with a little leaf mould will suit it, and the pot placed in a little bottom heat. Dr. Lindley separates the species from Asystasia and calls it Henfreya scandens.—*Bot. Mag.*, t. 4449.

Dendrobium Cambridgeanum. *Duke of Cambridge's Dendrobe.* A plant of great beauty, brought from India to Chatsworth by Mr. Gibson, collector for his Grace the Duke of Devonshire, in 1837, and was figured in our "Magazine of Botany," vol. vi., t. 265. It grows well, suspended from the roof, growing on a sod of solid Sphagnum peat.—*Bot. Mag.*, t. 4450.

Lapageria rosea. *Rose-coloured Lapageria.* In 1847, the Royal Gardens of Kew were first favoured with this beautiful plant, from Conception (Chili), through the kindness of Richard Wheelwright, Esq., an American gentleman. In 1848, Messrs. Veitch and Sons, of Exeter, imported it through their collector, Mr. Thomas Lobb, but neither have yet bloomed in this country. The flowers are large, of a rich and deep crimson, and the pulpy berry is prized as an eatable fruit, having a sweet and most agreeable flavour. Being a native of Chili it may be expected to be tolerably hardy, but it is best to treat it as a greenhouse plant.—*Bot. Mag.*, t. 4447.

Sobralia macrantha. *Large-flowered Sobralia.* This belongs to a fine genus of Orchids, having reed-like stems and handsome flowers, natives of tropical America, and the finest of all the species is the present subject, which was collected by Mr. Skinner, in Guatemala, and furnished to the Royal Gardens of Kew. It thrives best in the cool division of the Orchid house, the average winter temperature ranging between 55° and 60°, and should be potted in a light free soil, composed of sandy peat, loam, and leaf mould, with plenty of root-room and good drainage.—*Bot. Mag.*, t. 4446.

Stemonacanthus macrophyllus. *Large-flowered Stemonacanthus.* A handsome-flowered plant, easily increased by cuttings, but more desirable in a young state (when it readily blooms), than when it has attained a large size, for then the foliage predominates too much. It is a native of New Grenada, Mexico, and Jamaica, and was introduced in 1844 to the Royal Gardens, through Mr. Purdie. The plant grows three or four feet high, bears axillary panicles of bright scarlet flowers, and requires to be grown in stove heat.—*Bot. Mag.*, t. 4448.

CALENDAR OF OPERATIONS FOR JULY.

Now is the time to pay all attention to filling up deficiencies in flower-beds; all flowers in masses forming mixed beds, should also undergo a thorough regulation for the season. The beauty of beds of mixed colours, depends in a great degree on the harmony of the colours of the flowers, and a proper proportion of the amount of foliage to each plant. Trim and neatly tie up such plants, as by their heavy and abundant foliage would encroach on the equally beautiful but more delicately formed plants of stinted foliage. At this period of the year, when the weather is generally fine and warm, many inhabitants of the greenhouse are benefited by thorough exposure out of doors; but they should all have finished a first growth, and then be inured to the open air by degrees.

FRUIT AND VEGETABLE DEPARTMENT.

Glass.

Cucumbers and Melons should be paid attention to, and the laterals and superfluous growths be stopped or removed; give abundance of air and light.

Fig Trees in houses, should have as much light and air as can be conveniently supplied, and be daily well watered with liquid manure. Occasional syringing over-head is also very advantageous, except when the fruit are ripening.

Peach Trees under glass, will now be ripening their wood, or the later crops of fruit; at this time of the year, it is not uncommon for the trees to be attacked with mildew and red spider; sprinkle the leaves with sulphur, when either of these is the case, and give abundance of air. Aphis on the leaves may readily be destroyed by burning tobacco or tobacco-paper. When the wood of the earliest forced trees is matured, they may be fully exposed.

Pineries. Give such plants as are swelling up their fruit, a free supply of weak liquid manure, and abundance of air; but do not lower the temperature too much. When signs of ripening become visible, withhold water, but supply the air as before.

Vineries. Keep the young rods of the vines tied in, and give plenty of air. If the weather becomes dry, it may be necessary to water the borders in dry situations; but should the weather on the contrary, prove very wet, the effects of over-moisture must be counteracted by a free circulation of air, and an occasional fire during the day, whilst air is upon the house. See that the bunches of late grapes intended to ripen for winter use are sufficiently thinned, for unless this be the case, they are apt to retain moisture, and be thereby injured.

Open Air.

Budding of fruit-trees may now be proceeded with.

Thinning of the Fruit should be carried out so as to allow of those which remain to swell up to their full size, and admit of a sufficient support to perfect the buds for the following season.

Beans and Peas of early kinds, should be sown at this time of the year, they might be sown twice in the month, but the second sowing should not be later than the 10th.

Cauliflowers now planted, come into use at the end of September.

Cabbage, Broccoli, Borecole, and every kind of winter green should be planted as early as possible.

Kidney Beans may be planted for the last crop not later than the first week.

FLOWER DEPARTMENT.

Glass.

The Conservatory and Greenhouse will without great care, become infested with insects; as these are discovered, use the proper means for their destruction without delay. Fumigate cautiously, and let the house be cool during the operation. Thin the fruit of Orange-trees when they are too thick. Pot quick growing plants before their roots become matted. Put in cuttings of Pelargoniums, Heaths, and other plants; water freely, and give a deal of air night and day.

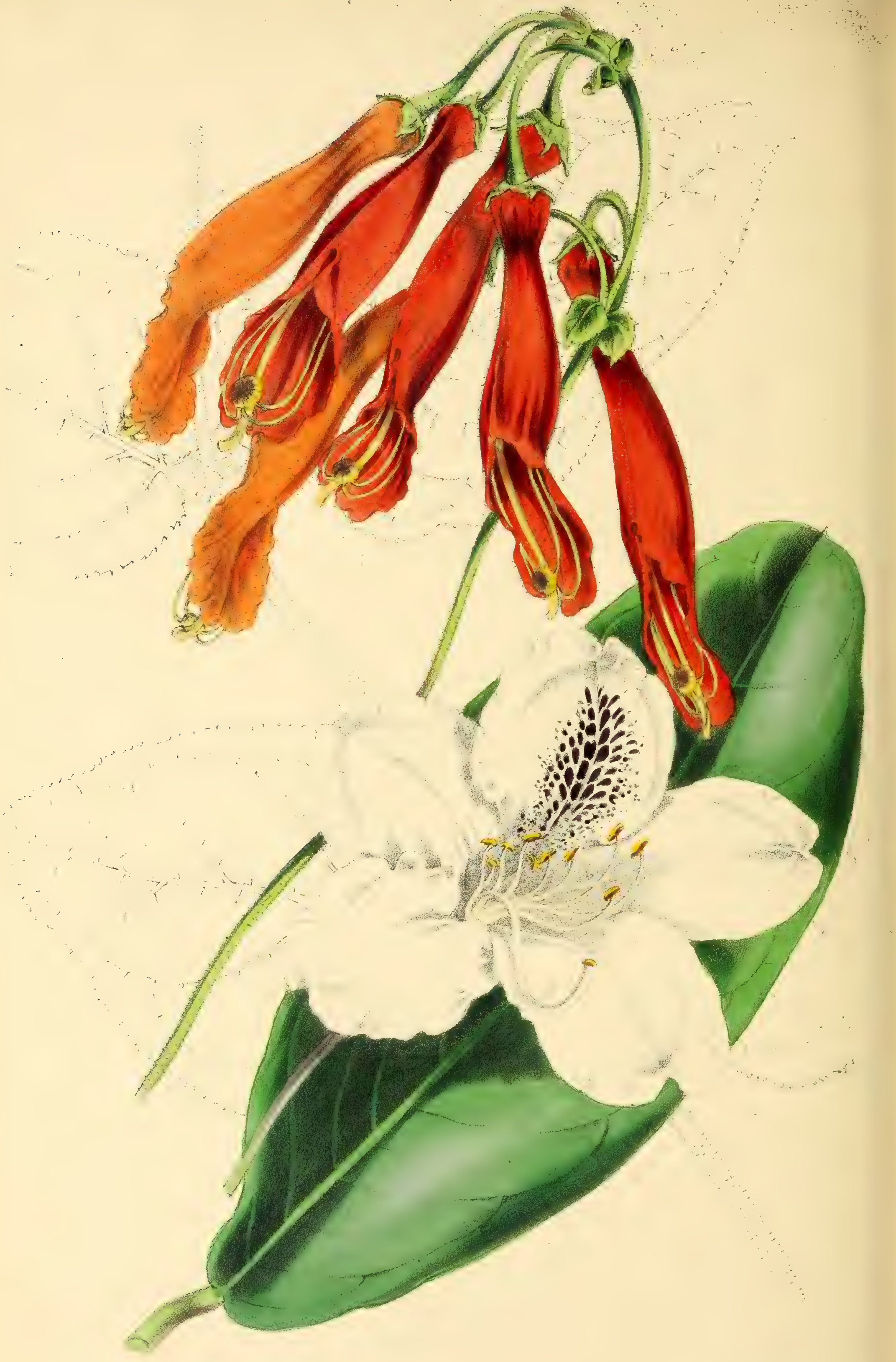
Orchids and Stove Plants. The former must be well screened from strong sunlight, and both must enjoy a humid atmosphere, with a free circulation of air.

Open Air.

Layer Carnations and Roses; and also progress with budding the latter, whilst the bark runs freely.

NURSERY AND FOREST-TREE DEPARTMENT.

Regulate growths in young plantations; layer and bud; make drains, prepare land for autumn-planting, and keep growing fences free from weeds.



1 Gesnera coruscans.
Rhododendron campanulatum superbum.

PAXTON'S

MAGAZINE OF GARDENING AND BOTANY.

RHODODENDRON CAMPANULATUM SUPERBUM.

(Superb Bell-flowered Rose-bay).

Class, DECANDRIA.——*Order*, MONOGYNIA.——*Nat. Order*, ERICACEÆ.——(Heath-worts, *Veg. Kingd.*)

GENERIC CHARACTER.—*Calyx* five-parted, or five-toothed. *Corolla* somewhat funnel-shaped, or campanulate; rarely rotate or five-parted; *limb* five-cleft, somewhat bilabiate; *upper lip* broadest, usually spotted. *Stamens* ten, usually exserted, declinate, sometimes from five to nine, and abortive. *Anthers* opening by two terminal pores. *Capsule* five-celled, five-valved; rarely ten-celled and ten-valved, with a septicidal dehiscence at the apex. *Placentas* single, angular. *Seeds* compressed, winged.

SPECIFIC CHARACTER.—*Plant* an evergreen shrub. *Leaves* elliptic-oblong, mucronate, rather cordate at the base; under-surface clothed with fine scaly pubescence, at first of a purplish hue, afterwards changing to nearly white, and finally to a deep ferrugineous brown. *Flowers* copious, disposed in corymbose clusters, very large. *Pedicels* glabrous, *Bracts* fringed. *Corollas* pale-pink, changing to white. having the uppper lip marked with irregular purple spots; *segments* flat, emarginate. *Filaments* bearded at the base. *Ovary* six-celled, glabrous.

SUPERBUM.—*Flowers* pure white, the upper lip spotted copiously, in very large clusters, holding twenty-three or twenty-four flowers; in other respects like the species.

THIS beautiful hybrid was raised by Mr. Jackson, of the Kingston Nursery, Surrey, from as he supposes seeds of *R. campanulatum*, although it is the opinion of Dr. Lindley that the kind is more nearly allied by the form of its flowers to *R. ponticum* than the bell-flowered Rosebays.

It is perfectly hardy, and on this account is a great acquisition; the foliage is fine, the truss of flowers immensely large, the individual blossoms are of a transparent, waxy white, the two upper segments are liberally spotted with rich crimson purple, and the throat also is spotted with brown.

Our drawing of this fine hardy plant was made in May, 1849, through the kindness of Mr. Jackson, who sent a bunch of the bloom to our artist.

Its cultivation is attended with no more difficulty than that of *R. ponticum*, merely requiring to be planted in a bed of sandy peat, or any other light soil in a situation in the flower-garden, where it cannot be injured by drought, drying winds, or too bright sunlight.

Propagation is effected by layers or enarching on the common kinds.

The generic name is derived from *rhodon*, a rose, and *dendron*, a tree.

GESNERA CORUSCANS. (Shining-flowered Gesnera.)

Class, Didynamia.——*Order*, Angiospermia.——*Nat. Order*, Gesneraceæ.——(Gesner-worts, *Veg. Kingd.*)

Generic Character.—*Calyx* adnate to the ovary; *limb* nearly equally five-lobed. *Corolla* semi-superior, tubular, with five gibbosities at the base; *limb* sub-labiate; *upper lip* drawn out, emarginately two-lobed; *lower lip* three-lobed. *Stamens* didynamous, with the rudiment of a fifth behind; *anthers* at first cohering into a round head. *Glands* five, or fewer, around the ovary. *Capsule* dry in the calyx, one-celled; incompletely two-valved; *placentas* two, parietal, many-seeded. *Seeds* scobiform. *Mag. Bot.*

Specific Character.—*Plant* a tuberous-rooted perennial; *tubers* scaly. *Stem* round, erect, herbaceous, simple, downy. *Leaves* cordate, opposite, bluntly serrated. *Flowers* on long slender peduncles, drooping. *Corolla* large, scarlet; *lower segment* long, wavy.

A new and very handsome species of Gesnera, native of South America, whence it was lately introduced by Messrs. Knight and Perry, Nurserymen, Chelsea. It has much of the character and habit of Gesnera Cooperi, especially in the form of the flower-spike and the disposition and colour of the flowers.

The same treatment usually applied to Gesneras is productive of luxuriance in this kind, namely, abundance of heat and humidity, and to be kept dry in winter.

Propagation is effected with the greatest facility by its leaves, or portions of the stem, and by tubers.

To Conrad Gesner, a celebrated Zurich botanist, the genus was dedicated by Linnæus.

PRIMULA ALTAICA. (Altaic Primrose.)

Class, Pentandria.——*Order*, Monogynia.——*Nat. Order*, Primulaceæ.——(Primworts, *Veg. Kingd.*)

Generic Character.—*Calyx* tubulous, five-toothed. *Corolla* salver-shaped; *limb* five-lobed. *Orifice* pervious. *Stamens* five, included. *Anthers* obtuse. *Stigma* capitate. *Capsule* five to ten-valved.—*D. Don.*

Specific Character.—*Plant* perennial, resembling *P. vulgaris*. *Leaves* erect, broad, robust. *Flowers* scapeless, large, purple, with an orange eye, fragrant. *Calyx* oblong, tubulous, shorter than the tube of the corolla, angular. *Corolla tube* cylindrical; *limb* spreading, *segments* bidentate.

Authorities and Synonymes.—Primula altaica, *Dr. Lindley* in *Journ. Hort. Soc.*, and also of the Russian Botanists.

This very pretty species of *Primula* is quite new to British gardens, and was discovered and introduced by C. J. Darbishire, Esq., of Rivington, near Bolton; who, whilst on a late visit to Constantinople, found it growing on grassy land, which had been recently cleared of brushwood, in the neighbourhood of Karak, a quarantine station on the Asiatic side of the Bosphorus, near the mouth of the Black Sea. As it was midsummer when he met with it, and being at that time out of bloom, he had no reason to suppose it to be any thing more than our common yellow primrose until it flowered in the following spring.

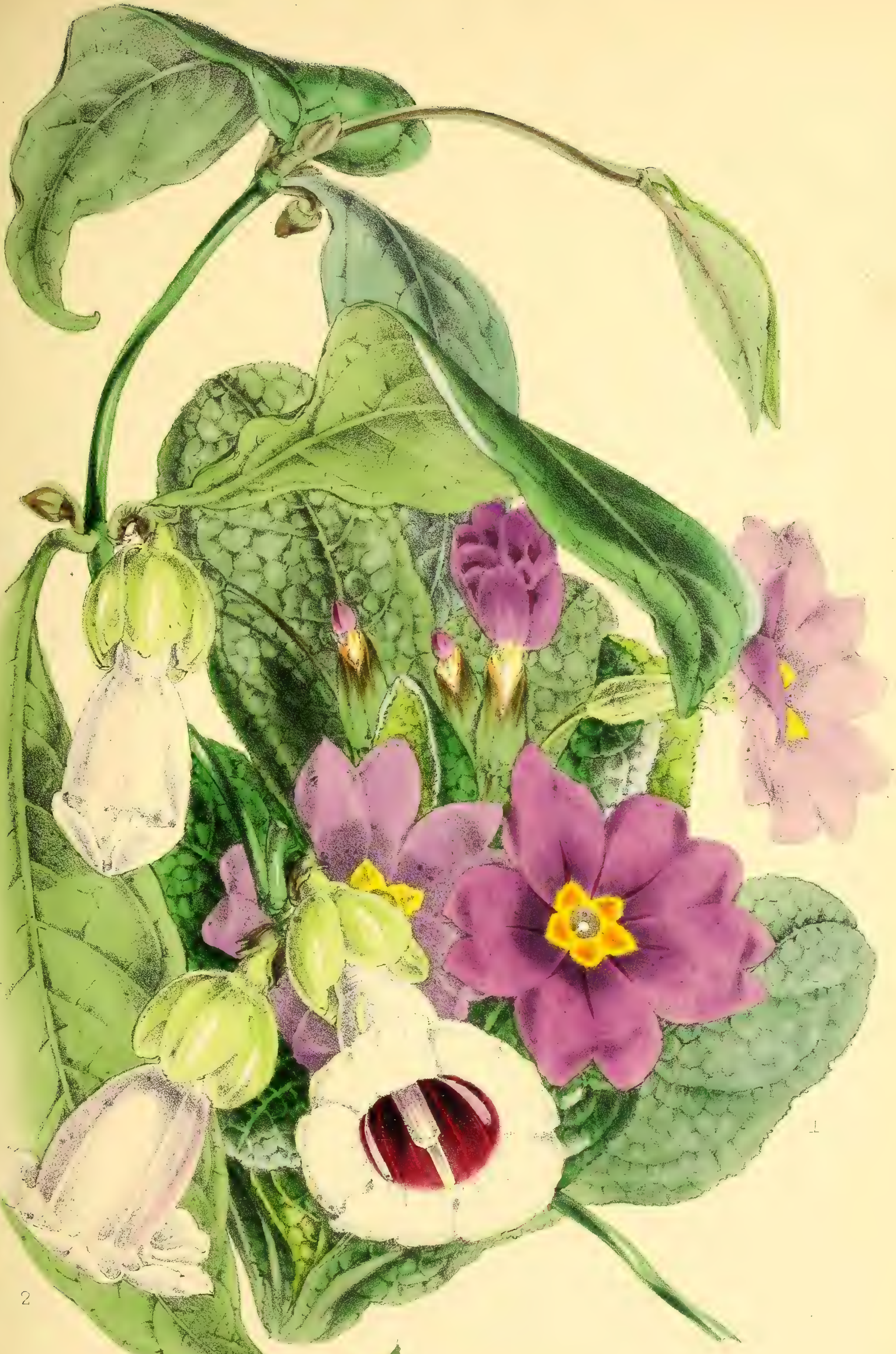
It is perfectly hardy, enduring our winters without injury; but as it appears to have a disposition to flower very early, when we have only cold and wet weather, Mr. Darbishire prefers taking the roots into the house at the latter end of the year: they then form beautiful and useful ornaments to the conservatory during the dark and dull season of winter, producing a profusion of bloom in succession from the end of October. The rich and delicate colours of the flowers are not fully displayed except in sunshine.

For our present figure and particulars we are indebted to the kindness of Mr. Darbishire, who without hesitation furnished our artist with a specimen for his drawing.

The plant is of the easiest cultivation, either in a pot or in the open borders, merely requiring to be planted in a light rich soil, and must when better known become an universal favourite.

Propagation is effected by separation of the roots, and by seeds like the other species.

The generic name is derived from *primus*, first; in allusion to the early flowering of the plants.



Holden del. & Lith.

1 *Primula altāica.*
2 *Gardenia Sherbournii.*

GARDENIA SHERBOURNIÆ. (Mrs. Sherbourne's Gardenia.)

Class, PENTANDRIA.——*Order*, MONOGYNIA.——*Nat. Order*, CINCHONACEÆ.——(Cinchonads, *Veg. Kingd.*

GENERIC CHARACTER.—*Calyx* with an ovate, usually ribbed tube, and a tubular truncate, toothed, cleft, or parted limb. *Corolla* funnel-shaped, or salver-shaped, having the tube much longer than the calyx, and the limb twisted in æstivation, but afterwards spreading from five to nine, parted. *Anthers* five to nine, linear, almost sessile in the throat of the corolla or exserted. *Stigma* clavate, bifid, or bidentate; *lobes* thick, erect. *Ovary* one-celled, half divided by two to five incomplete dissepiments. *Berry* fleshy, crowned by the calyx, chartaceous or nucleate inside, incompletely two to five-celled. *Seeds* minute, immersed in the fleshy parietal placentas. *Embryo* albuminous.

SPECIFIC CHARACTER.—*Plant* an evergreen shrub, with a climbing habit. *Branches* round, smooth. *Leaves* three inches or more long, elliptical-ovate, coriaceous. *Petioles* rounded. *Stipules* oblong, large, deciduous. *Peduncles* solitary, clothed with small bracts, one-flowered, produced in the axils of the leaves. *Calyx* large, campanulate; *lobes* five, wedge-shaped. *Corolla* campanulate, white, tinged with deep-red within; *limb* spreading, five-lobed; *lobes* rounded. *Stamens* inserted above the middle of the tube.

AUTHORITIES AND SYNONYMES.—Gardenia, *De Candolle*. Gardenia Sherbourniæ, *Hooker* in *Bot. Mag.*, 4044.

OUR drawing of this rare and new species of Gardenia was made in the stove of Messrs. Knight and Perry, Nurserymen, Chelsea, in October, 1847.

The plant is a native of Sierra Leone, where it is stated by Mr. Whitfield, its discoverer, to produce an agreeable tasted fruit, and whence it was received originally by Mrs. Sherbourne, of Hurst House, Prescott, Lancashire, and where it flowered for the first time in June, 1843.

It requires similar treatment to the other tender Gardenias, namely, a soil composed of rough peat, leaf-mould, and silver sand, in nearly equal proportions; well drain the pots, and lay a little moss over the potsherds to prevent the compost from mixing with the drainage. Give a high temperature in the growing season, with abundance of atmospheric moisture, and a good supply of water at the roots; and a free growth and abundance of bloom may be expected.

The genus is named in honour of Alexander Garden, M.D., of Charlestown, Carolina, a botanist in the days of Linnæus.

CHEMISTRY OF HORTICULTURE.

By John Towers, Esq.

(Continued from Page 166.)

ATMOSPHERE—Atmospheric air. In former articles the two gases that constitute the volume of respirable air (oxygen and nitrogen, or azote), have passed under notice. It remains, however, to investigate the experiments of those chemical philosophers, which have led to the conclusion that the atmosphere in its natural condition, pure and free from every deleterious admixture, is always composed of four materials, two of which, are always subject to occasional variations. The average results of many experimental researches, have been pretty accurately determined; they show the presence in 100 parts, of

	By measure.	By weight.	
Nitrogen Gas	77·50	75·55	constant.
Oxygen	21·00	23·32	
Carbonic Acid	0·08	0·10	variable.
Watery Vapour	1·42	1·03	
	100·00	100·00	

The two last variable components shall in due time be examined; but we must previously appeal to authorities.

Lavoisier, by patient attention to a thrice-repeated experiment (each of twelve days' duration), on mercury exposed at a boiling heat to the influence of air in close vessels, effected the analysis of that air, and determined that 27 parts of weight out of

100 disappeared; the mercury having *gained so much*, and undergone a complete alteration in its form and appearance, while 73 parts of a gas unfit for respiration (azote, then so called) remained unabsorbed. He reproduced these 27 parts, restored the metallic mercury, and therefore, proved that the 27 parts consisted of vital, respirable air (oxygen). He then mixed the two gases so as to produce a total of 100 parts, and found that an elastic fluid, precisely similar to atmospheric air, was the result; and thus he effected what he deemed the *synthetic proof* of the composition of atmospheric air.

Other chemists have subsequently arrived at rather different conclusions, concerning the proportions of the two prime constituents of air. Thus, Dr. Henry estimated them at 21 per cent. of oxygen gas, and 79 per cent. of nitrogen, both by measure—the difference evidently arising from the omission, by Lavoisier, of the carbonic acid and watery vapour. The late Samuel Parkes, an excellent practical chemist of the wholesale laboratory, agreed with Henry; adding, that by weight, the two gases are as 23 of oxygen to 77 of nitrogen. He estimated the water or aqueous vapour at 100th, and the carbonic acid at 1000th part of the whole.

Mr. Dalton's analysis gave in the 100 parts—

Oxygen Gas	21·00
Nitrogen Gas	77·50
Aqueous Vapour	1.42
Carbonic Acid	0·08
	100·00

Carbonic acid, formerly known as *fixed air* and *aërial acid*, was discovered in 1757, by Dr. Black, of Edinburgh. It is obtained in its purest state by the combustion of the diamond in oxygen gas, an experiment which has proved that the most costly of precious stones is simply charcoal in its most exalted condition, produced in the stupendous laboratory of Nature. Before entering upon any further inquiries, the reader should be told that carbonic acid however produced, suffers no increase of bulk above that of the oxygen gas, with which the required quantity of carbon combines. The ultimate atom or particle of carbon is six times heavier than that of hydrogen; and as oxygen, as we have seen, is equivalent to 8, therefore, the combining proportions of the two, are represented by—

$$\left.\begin{array}{l}\text{Carbon } 1=\ 6\\ \text{Oxygen } 2=16\end{array}\right\}=22$$

The experiment now to be described, is often exhibited in lecture-rooms. *Charcoal* is burned in a bell-glass of oxygen gas, and furnishes brilliant sparks in great profusion. If the charcoal be hard, well-burned, and made from a close, dense wood, the scintillations are not so striking and numerous, as when the tissue is lax and spongy; it consumes with intense glowing heat, and gradually disappears, the product being carbonic acid in equal volume with that of the oxygen employed. Some years ago, an immense quantity of sesquicarbonate (commonly called *Carbonate of Soda*) was made by merely exposing crystals of soda in shallow canvas trays, to the action of the fume of burning charcoal. By degrees, the acid gas developed by the combustion, combined with the soda. The crystals discharged the bulk of the water which they contained, and were converted into opaque, cellular, and light masses of the sesquicarbonate. *Lime* combined with carbonic acid in the proportion of about nine of the former to seven of the latter, becomes chalk (Carbonate of Lime). Pure white marble is chalk in a granular or crystalline form. Let small fragments of *that* be introduced into a two-necked bottle, adding water sufficient to cover them: then, pour muriatic acid into a small glass funnel that has a long slender tube which passes half through the water, but not so far as to reach the fragments. Every drop will produce effervescence by combining with the lime of the marble, and releasing the aërial carbonic acid. This may be collected by passing it through a tube doubly bent, into an inverted glass jar, filled with water, and standing on the shelf of a pneumatic trough, and will thus be obtained in a state of great purity; but as water slowly absorbs it, it cannot be long preserved. Professor Brande says that, "Thus obtained, it is a colourless gas of a slightly sour odour, considerably heavier than atmospheric air, its specific gravity being about as 1·52 to 1·000. Compared with hydrogen, its specific gravity is as 22 to 1. The liquefaction of this gas has been effected by a very delicate but dangerous operation, which was described in the Phil. Trans. of 1823.

As carbonic acid gas is formed by the combustion of any substances that contain carbon, the oxygen of the air combining with the burning carbonous matter, so it is developed during fermentation, putrefaction, and decay, by a slow natural process of combustion; it is not, therefore, at all surprising that, to a certain extent, it should be always present in atmospheric air, though its volume must vary in proportion to the quantity extricated during the several generating processes. Carbonic acid is evolved from the lungs of every breathing animal; and perhaps, if we attach credit to the facts stated by several physiologists, "from the coloured parts of flowers, both by day and night, and from the green parts of plants during the night." The odour of flowers is offensive and deleterious to many persons, and as the effluvium exhaled is material, although indiscernible, it is more than probable that the carbonic acid, said to be evolved, is combined with the vapour of essential oil, specific to each flower; and if so the presence of hydrogen must be included. But though any hypothesis, or mere supposition must be received with jealousy, yet it is in the power of every reader to establish the fact that carbonic acid is expelled from the lungs; for, if any one will force his breath through a straw or reed into clear water, he will soon perceive that the bubbles produce almost immediately a faint haziness, which gradually increases till the liquid becomes quite white, from the combination of pure lime in the water with the carbonic acid of the breath, the one neutralising the other, and constituting chalk, which is carbonate of lime. The subject is of deep interest to the gardener, who is often perplexed by the hardness, and ungenial qualities of the water, which he may be constrained to employ during the absence of rain, or of soft water streams. It has lately come under serious and scientific notice, and will require our close investigation in a future article.

Lime water properly made affords a delicate test of the presence of carbonic acid in the air. Lime of the best quality and when fresh from the kiln, is soluble in water, though only to the limited extent of about one ounce in 4½ gallons, and therefore a great error is committed when persons throw a quantity of lime into a small vessel in order to insure a strong solution wherewith to remove the mosses, lichens, &c., which are apt to disfigure the stems and branches of currant and other shrubs. Lime water, kept for a time in a close stopped bottle, becomes quite clear; when so, if a small quantity be exposed in a saucer in the open air, a thin coat or pellicle will speedily form on the surface, and this, if disturbed, will fall to the bottom as flakes. These being tested with a few drops of muriatic acid, or strong vinegar, will effervesce with a hissing sound, and the extrication of frothy bubbles of carbonic acid; proving that the pure lime, in solution, has attracted and combined with the carbonic acid floating in the atmosphere.

Hot lime simply exposed, under cover of an open shed, will gradually lose its form and crumble into a white powder. This first effect demonstrates the presence of water in the air, and so far the lime becomes simply air-slacked, retaining for a time its alkaline causticity: but by protracted exposure, it combines with the floating carbonic acid, and gradually is converted to inert chalk, or true carbonate of lime.

Watery vapour must, of necessity, be always present, in consequence of the immensity of the volume evaporated from the surface of the earth. "When Dr. Halley was at St. Helena, he made a variety of experiments on the evaporation from the surface of the sea, and found that ten square inches of water evaporated one cubic inch in twenty-four hours; or that a surface of a square mile would evaporate daily 6914 tons. It is calculated that the Mediterranean Sea evaporates daily no less than 5280 millions of tons. The total average quantity of water evaporated from the whole surface of the earth is calculated by Dr. Thompson, to amount annually to 94,450 cubic miles." Even in the driest seasons, when the ground was parched and appeared void of moisture, when it cracked and formed rents and fissures, it was ascertained by experiment, with a glass placed on the ground, that

1600 gallons of water must have evaporated from an acre of surface every twenty-four hours.

If a single pint of water in a state of vapour occupies 1400 or 1500 pints, what must be the volume of vapour derived from the stupendous bulk of water that is conveyed into the atmosphere, by evaporation, from the entire service of the whole globe?

About two-thirds are supposed to be precipitated in the form of rain, another small portion is deposited as dew; but admitting these suppositions to be facts, what becomes of the remainder of the vaporised water? Is it decomposed? If so, what is the decomposing agent, and what the products? The subject is too involved for present discussion. It was considered at length in the Domestic Gardener's Manual, from which the above extract was taken. Electric agency must be kept in view, and from it we may perhaps hereafter derive something approaching to a solution.

ON THE FORMATION OF THE PINETUM.

By Henry Bailey, Nuneham Park.

There are few pursuits (within a recent period) which have made more rapid advances than the art of Gardening. The field which is now open to the amateur and professed practitioner, embraces a wide range; so much so, that it is divisible into several distinct sections, each laying open an almost unlimited field for the exercise of taste, ingenuity and perseverance, and requiring a considerable amount of cultural, physiological and botanical knowledge, to enable those who patronise it to carry it out to the fullest extent.

Whether our attention is turned to the gorgeous and grotesque family of Orchids, the numerous and beautifully designed Melo- and Echino-Cacti, and the singular species of the succulent genera allied to them, or whether we cultivate with care the charming Calceolaria, the gay and graceful Geraniums; or, turning our thoughts to the hardier denizens of the open air, the lovely family of Rosa, the stately Rhododendron, and its congener the elegant and varied Azalea—how infinite is the field which lies before us! and what inexhaustible stores of variety and beauty are treasured up in the womb of Nature, ever ready to be developed by the exercise of those faculties of reason and observation with which we are endowed by an all-bountiful Providence: and which exercise ever brings in its train, the purest and most peaceful pleasures, solacing us in our trials and troubles by its mild influence, and giving zest to all the gentle amenities of life.

While, however, the culture of exotic flowers can only be fully carried out by the possession of adequate structures, and a considerable amount of cultural knowledge is necessary to secure satisfactory results, the trees and shrubs which will endure the open air of this country, possess great interest for the proprietors of large and small estates, their variety and permanent beauty rendering them fitting embellishments and suitable accompaniments both to the grounds of the mansion, and the villa residence. In illustration of this, how much interest and variety may be produced in a limited space by the judicious distribution of the popular genera, Cratægus, Pyrus, Cytisus, Cotoneaster, Rhododendron, Mahonia, Erica, &c., and on a larger scale by the introduction of the hardier foreign species of trees.

Among the trees which are hardy in this climate, the Evergreen Conifers have long occupied a prominent position; the stately Cedar of Lebanon, the Spruce Fir, Scotch and Weymouth Pines, with the Pinaster are, however, almost the only kinds found in old and characteristic places. By the labours of the ill-fated, lamented, and persevering Douglas, and other enterprising travellers, many useful and beautiful species (quite hardy) have been added to our once limited collections, and there are now few gardens which do not boast of the singular and stately Aruncaria, and the graceful Deodar; while in many places the fancy for collections of this interesting family has been carried to an extent which may fairly be called Pino-mania.

One of the evils which has resulted from the increased love for variety and novelty in the grounds appended to mansion residences is, that since it has become fashionable to collect large quantities of these trees, they have been but too generally distributed at random, too frequently spotting and frittering the fine breadths and glades of open lawn which the artist of former days had so happily designed, and detracting by *miserable comparison* from the grandeur and dignity of their more *stately and picturesque indigenous neighbours ;* at the same time, destroying that congruity and unity of expression which should pervade the whole.

There are at this moment in this country, some magnificent collections of Pines, which have been planted without the slightest attempt at scientific or picturesque arrangement. There are some, equidistant lines in open spaces ; there are others doling out a wretched existence under lofty indigenous trees ; all these we think, are not what they ought to be ; but believing that a Pinetum is a charming addition, and calculated to heighten the attractions of a country residence, we will now proceed to give an idea of an arrangement which we think would satisfy the ("*elegantiæ formarum spectator*") and combine the scientific interest which the mere botanist would expect; and in doing this, it will be necessary to bear in mind that in the age in which we live, while the principle of utility is not to be disregarded, we must endeavour to make that which is simply useful, agreeable, elegant, and attractive, to well-regulated minds.

It is strangely anomalous, but no less "strange than true," that persons who are possessed of the most refined and classical taste as regards sculptures, paintings, and other works of art, are constantly committing great and gross errors in the arrangement of rural scenery. And there needs no more convincing proof of this, than a reference to the unmeaning mixtures and fritterings of Conifers, by courtesy called Pinetums.

Many of our readers are doubtless acquainted with Woburn Abbey, the seat of his Grace the Duke of Bedford, and probably with that portion of the grounds of that princely residence, called "the Evergreens," and planted by John, Duke of Bedford, in 1742. Considered as a collection of Evergreen Trees, formed with the limited varieties then known (as compared with our present researches), this is, perhaps, the most perfect of its kind. That great authority, Mr. Repton, speaking of it, says—"I must not here omit the full tribute of applause to that part of the drive at Woburn in which Evergreens alone prevail ; it is a circumstance of grandeur, of variety, of novelty, and, I may add, of winter comfort, that I never saw adopted in any other place, on so magnificent a scale. The contrast of passing from a wood of deciduous trees to a wood of evergreens, must be felt by the most heedless observer; and the same sort of pleasure (though in a weaker degree), would be felt in the course of a drive, if the trees of different kinds were collected in small masses or groups by themselves, instead of being blended indiscriminately."

How little does the more modern disposition of the Pinetum in our grounds accord with the principles laid down by this great master, whose opinions are just quoted. But how much might be done to produce picturesque and scientific interest, by taking them as a guide.

How beautiful and imposing would be the effect, if, after proceeding through an ordinary woodland drive of deciduous trees, we could enter one having a wild foreground of Furze and Thorns, with the Pines scattered about in the natural groups into which they are divided, preserving occasionally considerable breadth to distant scenery, and bearing in mind that *indiscriminate mixture does not produce variety, but sameness.* And if the Araucarias, Cedar, Junipers, Cupressus, Cryptomerias, &c., were introduced in the same manner, how delightful it would be as a winter resort—

> "Here dark trees,
> Funereal Cypress, Yew, and shadowy Pine
> And spicy Cedar, clustered,"—

would greet us with their perpetual verdure and give us that salutary shelter from the cold blasts; and here, we would introduce Mahonias, Double-flowering Furze, with

Rhododendrons, Azaleas, and hardy Heaths, and even Scarlet Thorns. Such is, we think, the beau-ideal for the arrangement of a collection of Conifers, and such might be rendered more interesting, if planted by a distinguished member of a noble family; or to commemorate by its perpetual verdure some interesting event, relating to the family or place. We would, therefore, record on a tablet, by whom, and in what year it was planted. It is always interesting to mark the comparative progress of different varieties of useful trees, planted together at the same time. We should prefer a gently undulated surface of ground for our site, and a deep mellow sandy loam; we would trench this up 2 feet deep, in large holes (where it is intended to plant) adding a quantity of surface soil to each hole so prepared, sufficiently to raise it 18 inches above the natural surface. This gives importance to young specimens, and dignity and an appearance of stability to older ones. The selection of plants is of much importance; we prefer young ones, for the reason that if kept long in pots in the Nursery, the roots become so completely coiled round the pots, that if separable at all, the plant suffers much mutilating, and if planted with the ball of earth entire, the tree *never becomes fixed*, but is constantly moving about, like a joint in its socket.

It is desirable, as much as possible, to give what Sir Henry Stewart calls "immediate effect;" but the removal and planting of large Coniferous Trees when confided to unpractised hands, but too often defeats its own purpose. It is, however, to be accomplished, but only by considerable expense, and the exercise of great skill and judgment. In illustration of this, we would point to what has been accomplished in the extraordinary garden of the Earl of Harrington at Elvaston Castle, under the superintendence of his most able and skilful gardener, Mr. Barron. If it is determined to employ respectable specimens at once, we would reject these from pots.

In the nursery grounds of Mr. Pince of Exeter, we saw (a short time ago) a magnificent lot of Coniferous specimens, which were about to be planted into large open crates made of Elm, which when plunged, would allow the emission of the fibres; and always secure a good ball of earth for transporting. This we think to be an admirable idea, and one calculated to ensure to those who desire to have specimens at once, the most certain success.

If plants from pots are used, they should be of small size; and in proceeding to plant them, the whole of the roots should be shaken out from the ball of earth, selecting the tap root, and inserting it in the earth in a vertical direction, carefully filling in the soil and pouring in a little water to close the interstices, and then laying out with great care the other roots in a horizontal direction. We attach great importance to the preservation of this organ, regarding it as a wise provision of nature to give stability to heavy-topped trees, and feeling that it should be our province to assist her operations, rather than to do violence to her laws.

A most important consideration yet remains to be touched upon, namely the fencing. Happily for the interests of the human race, hares and rabbits are much less extensively preserved than formerly; but still enough of these destructive animals remain to render it necessary to secure our rare plants by some kind of fence; and for the purpose, we deem iron the best from its lightness and durability. But in fencing against rabbits, it must ever be remembered that they not only come through, but are constantly burrowing under our fences; therefore it is necessary to have a row of rough stones inserted in the ground at the base of the fence to prevent this. We would lay great stress upon having secure fences, as we can conceive nothing more mortifying than after great trouble and anxiety (not to mention expense) to have our hopes marred and blighted by the excavations of these animals.

In conclusion we would notice that it is but too common a practice to put stakes to, and tie up the leaders of Cedars. This we have found to be a bad practice; if the trees are planted young, and left to themselves, merely removing rival leaders (to which due attention must be paid), they will in time gain strength and do better than if trained. In the propping system it is difficult to know when to leave off the support.

We trust that these remarks which are the result of much reflection and observation connected with the subject, may be instrumental in inducing many to plant largely of this interesting tribe, and when about to do so (whether they intend to complete at once their arrangement, or it be done progressively), that they may lay down some well-digested plan by which to be guided, and which may ultimatively form a perfect and harmonious whole, that will redound to the credit of its projector and the "glory of the gardens," of the 19th century; as much as the Evergreens at Woburn do to the honour of the noble Duke who planted them. "The inequality and variety of surface, together with the different species of trees and shrubs by which it is decorated, render this one of the most interesting landscapes in the country."—(Forbes in *Hortus Woburnensis*), and it is perhaps the grandest monument which could have been raised to the patriotism and liberality of that high-minded nobleman.

INFLUENCE OF CLIMATE ON VEGETATION.

By Mr. Moore.

The influence of climate on the development of vegetation, though not alone dependent upon the atmospheric temperature, is yet largely effected by it, for we know that a certain degree of heat is essential to the well being of every vegetable. That essential amount of heat is found to be variable in respect to different species of plants, depending in a great measure on their natural distribution over the surface of the earth; for as the natural temperature is greater at one place than at another, so has it been wisely provided, that the vegetation which exists naturally in every place is adapted, so to speak, for the climatic conditions which there exist. It is because this is so, that a knowledge of the conditions under which a plant is placed in a state of nature, becomes so essential to the cultivator, who can have no surer guide as to the constitution of the objects of his care. There are, indeed, some few species of plants which are found widely extended over the earth, and under conditions extremely different; but these are exceptions to the rule, and consist chiefly of that class of subjects which seem to follow the steps of man wheresoever he goes.

Now, it is not because temperature constitutes climate, that it has been taken as the index to the climatic conditions which exist over the earth's surface, but because it is the most tangible element of climate. It cannot be said to be the most important element, because a due proportion of the other elements are equally essential; but, apparently from custom, there seems to exist a disposition to look upon temperature as the leading feature of those conditions, which constitute what we call climate; and so that this position is understood, there can be little practical objection to the viewing of it in this light. There is indeed some advantage in this, since thermometers are common and well understood instruments, and a large amount of information concerning the climate of almost every part of the known world exists, based on the variations of temperature, that is to say, moulded to this fashion which popular will has approved.

Hence, though the cultivator may be warned against looking too much to the temperature of his artificial climates, to the neglect of moisture and the admission of light, it does seem desirable to bow to the popular notion, and continue the elements of temperature as the convenient index to the more bulky materials of the subject, if it be only to avoid unnecessary intricacy.

I have already observed (p. 15), that the existing conditions of natural climate as to its temperature, render it obvious that a greater *variety of artificial climate* than is at present generally afforded, is required to cultivate successfully the different kinds of exotic plants which have been introduced to our gardens from every part of the world. Though the whole world has contributed to the number of objects of cultivation, yet are they generally classed into three groups, a number altogether insufficient to lead to the recognition of that variety of artificial climate which is essential to their well-being.

Under this impression, I have recommended that the old titles of "stove" and "greenhouse," as applied to the plants of tropical and temperate climates, be given up, and exotic plants classified anew, into a greater number of groups; so that universally, and not partially, the variety of climate required may be understood, and the knowledge practically applied.

These views on the subject of climate are in unison with the scheme of a somewhat recent work on the geography of plants.* In this volume the climatic groups of plants are more numerous than those we popularly allow; and, consequently, the range of temperature, correspondent with each group, is much more limited than we have been under the necessity of associating with the terms "stove" and "greenhouse," as applied to exotic vegetation. I cannot, therefore, but think that it would be extremely useful to those cultivators, who may not have access to Meyen's work above alluded to, if some little space be devoted to the explanation of his scheme, and some of the particulars of the climates corresponding to his zones and regions: not that these supply exactly what the cultivator seems to require in recasting his groups of exotic plants, but because the scheme itself is calculated to lead the mind in the right direction, substituting, as it does, an eightfold for a threefold division of the earth.

Meyen divides the surface of the earth from the equator to the poles into eight zones, characterised by a certain mean temperature, and these zones are again divided into regions from the level of the plains to the snow line. It is well known that in proceeding from the equator towards the poles the temperature diminishes in something like ratio; and that in ascending from the sea level towards the point of congelation, the same result is found. Hence, if there be sufficient altitude, though it be in the tropics, there will be perpetual congelation, equally as in the arctic regions; and further, there will be a relation between the intermediate points of latitude and altitude.

It was because the common astronomical division of the surface of the globe into the three zones—the torrid, temperate, and arctic—was not found sufficient for the purposes of botanical geography, the zones being too few and extensive, that Meyen proposed to divide each hemisphere into eight smaller zones founded upon the common division, and to divide the altitudinal range of vegetation into a corresponding number of regions. And it is a fact worthy of the consideration of cultivators, that not only is it found that the zones are characterised by a peculiar vegetation; but there is a parallelism between the horizontal range and the vertical range of vegetation, "in exact correspondence with the parallelism between the decrement of heat from the equator to the poles, and from the plains to the peaks of the mountains."

It must, however, be borne in mind that divisions such as those referred to, are but approximations; they are of necessity arbitrary; and the zones and regions themselves, blend insensibly with each other. It is admitted that there is often on different mountains in the same latitude, a difference of several hundred feet in the height of the same vegetation; so that in fact, there is no such exact and regular distribution of vegetation as Meyen assumes. Nevertheless, these assumed divisions afford certain data to the cultivator, which are to him of the utmost value, as showing the nature of the relation existing between the vegetation of one part of the globe, and that of another.

It appears that beginning at the polar zone, the snow-line rises about 1900 feet for each of the before-mentioned eight zones. Thus we should have the snow-line at an elevation of 15,000 or 16,000 feet in the equatorial zone, which is found to be near the truth, the snow-line of Cotopaxi being at an elevation of 15,646 feet, and on Chimborazo, at 16,000 feet. This increase of 1900 feet for each zone in the limits of vegetation, corresponds to the regions into which the mountain vegetation is divided. This, the following table will more clearly exhibit.

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* Outline of the Geography of Plants, by F. J. F. Meyen, Ph. D., M.D., translated for the Ray Society.

Distance of the regions from the plain.	Name of Zones.	Equatorial Zone [I.]	Tropical Zone [II.]	Sub-tropical [Zone [III.]	Warmer Temperate Zone [IV.]	Colder Temperate Zone [V.]	Sub-arctic Zone [VI.]	Arctic Zone [VII.]	Polar Zone [VIII.]	Distance of the regions from snow-line.	Mean annual heat of the regions.
	Area of Zones.	Lat. 0-15°.	Lat. 15-23°.	Lat. 23-34°.	Lat. 34-45°.	Lat. 45-58°.	Lat. 58-66°.	Lat. 66-72°.	Lat. 72-82°.		
	Mean Heat.	30-26° Cels. [80-86° Fah.]	23-26° C. [74-80° F.]	18-21° C. [65-70° F.]	12-16° C. [54-60° F.]	6-12° C. [44-54° F.]	4-6° C. [40-44° F.]	0-2° C. [32-36° F.]	—2° C. and under. [28° F. & und.]		
15200′		15200′	13300′	11400′	9500′	7600′	5700′	3800′	1900′		
13300′	[Region VIII.] (Alpine Plants.)		11400′	9500′	7600′	5700′	3800′	1900′	0′	1900′	3-4° C. [37-40° F.]
11400′	[Region VII.] (Rhododendrons.)		9500′	7600′	5700′	3800′	1900′	0′		3800′	7° C. [45° F.]
9500′	[Region VI.] (Abietinæ.)		7600′	5700′	3800′	1900	0′			5700′	11° C. [52° F.]
7600′	[Region V.] (Europ. Dicotyled. Trees.)		5700′	3800′	1900′	0′				7600′	14° C. [58° F.]
5700′	[Region IV.] (Everg. Dicotyled. Trees.)		3800′	1900′	0′					9500′	17° C. [63° F.]
3800′	[Region III.] (Myrtles and Laurels.)		1900′	0′						11400′	20-21° C. [68-70° F.]
1900′	[Region II.] (Tree Ferns and Figs.)		0′							13300′	23-25° C. [74-77° F.]
0′	[Region I.] (Palms and Bananas.)									15200′	27-30° C. [80-86° F.]

The construction of this table is obvious; thus the region assigned to Alpine plants, which, in the Arctic zone, occupies the elevation of 1900 feet, in the tropical zone will be at an elevation of 11,400 feet, under the colder temperate zone at 5700 feet, and so on with the other regions. Meyen's names for these regions are inserted in parentheses: the object of inserting the table is better accomplished by numbering the regions and zones, than by giving prominence to their names. So far as artificial cultivation is concerned, the horizontal zones of vegetation may be considered as severally identical with the vertical regions, according to the numbers respectively attached to each series.

The remainder of the present paper will be appropriately occupied with some additional particulars respecting the zones and regions indicated in the accompanying table, as prefatory to a scheme for dividing the surface of the earth, somewhat after Meyen's plan, into regions corresponding with the series of garden structures which is assumed to be required for the cultivation of a full miscellaneous collection of exotic plants. The zones and regions will be taken in conjunction one with another.

Zone I.—The Equatorial Zone is characterised by the high annual mean temperature of 80-86° Fahr., which when accompanied by a corresponding amount of moisture gives rise to the most luxuriant vegetation. *Palmæ*, *Musaceæ*, arborescent grasses, *Scitamineæ*, and *Orchideæ*, are generally prevalent. The trees of the mighty forests are covered with splendid epiphytes, and the most elegant ferns; whilst high among the foliage, are the *Loranths*, *Tillandsieæ*, and *Pitcairniæ*. The variation in the supply of moisture causes striking differences, as is seen in the deserts of Africa, the Pampas of Peru, and the Savannahs of the Orinoco. This zone comprises 15° of lat. on each side the equator.

Region I.—Beginning at the sea-coast, wherever there is rich soil, Palms, Musas, and Scitamineæ, are characteristics up to 1000 or even 1600 feet. There begin, in the New World, the Cereuses, and in the Old, the Cactus-like Euphorbias. With increasing altitudes, Palms and Scitamineæ begin to disappear, but the Orchideæ become more numerous.

Zone II.—In the Tropical Zone we have a mean annual temperature of 74-80° Fahr. Here is an endless mass of arborescent Ferns. *Convolvulaceæ*, *Melastomaceæ*, and *Piperaceæ*, are predominant towards the limits of the torrid zone. The zone reaches from 15° of lat. to the tropics. Much of this tract is poor, and insufficiently supplied with moisture. Here we have Rio de Janeiro, the extreme south of China, India, the Sandwich Isles, the northern part of the Philippines, the West Indian Islands, &c.

Region II.—The Tree-Ferns occur profusely where the climate is damp, but where the atmosphere is dry they are wanting. In the New World, the Melastomas are exceedingly abundant, and the Cinchonæ are characteristic. In the South Sea Islands the family of *Urticeæ* predominate in the genera *Broussonetia*, *Artocarpus*, &c. In India, and the Indian Archipelago, these are replaced by species of *Ficus*. The Ferns keep very closely between 1200 and 3000 or 4000 feet.

Zone III.—From the tropics to 34° lat. The mean temperature is 65-70° Fahr. Meyen speaks of this zone as possessing "the happiest clime." The Canaries, and Madeira occur here; as do Southern Africa, Egypt, the western parts of India, and part of China and Japan. The greater part of Australia, the Cape Colony, and a small zone of South America occur here. The *Myrtaceæ*, Camellias, the Tea-plants, and a great number of succulent plants, as *Sempervivum*, *Mesembryanthemum*, *&c.*, occur in this zone. The *Proteaceæ*, *Eucalypti*, *Acaciæ*, *Ericæ*, attain their maximum. The Cacti abound in sub-tropical America.

Region III.—*Myrtaceæ* and *Laurineæ* are the predominant forms, the latter occupying the greater altitude. In Chili, Myrtles occur in great numbers. In the mountains of Java, beautiful *Coniferæ* appear, the *Nepenthes* climbing their trunks.

Zone IV.—The warmer Temperate Zone situated from 34 to 42° lat. In Europe it includes all the southern part, as far as the Pyrenees, the mountains of the south of France, and of the north of Greece. Asia Minor, the tract between the Black Sea and the Caspian, the northern part of China and Japan, all lie in this zone. The flora of the north of Africa has quite the aspect of that of the extreme south of Europe. This zone also includes the southern parts of the United States of America in the southern hemisphere, New Zealand, Van Diemen's Land, the south of Chili, and the country south of Buenos Ayres as far as Patagonia.

Region IV.—The region of Evergreen Dicotyledonous trees. It generally possesses a most delightful climate, a mean temperature of 63° Fahr., and an abundant supply of water.

Zone V.—The colder Temperate Zone extends from 45° to 58° lat. In Europe it commences on the northern side of the mountain chains of the south of Europe. In Asia, it embraces the Caucasus, a great part of the Ural Mountains, the Altai and Daurian chains, and continues to the shores of the Pacific. Sitka on the Western coast of America, and in the Southern hemisphere the Falkland Isles, belong to this zone.

Region V.—This is the region of Dicotyledonous trees. It is sufficient to quote the statement that its vegetation corresponds with that of the colder temperate zone.

Zones VI. to VIII., and *Regions VI. to VIII.*—embrace the remaining districts above 58° lat., and the altitudes corresponding thereto. The scale is now turned; many of the plants of these districts require to be sheltered from the heat, and sometimes the moisture, rather than from the cold of our climate.

THE ROSE.

Pliny, in his natural history when treating of the Rose, in a great measure follows the account given by Theophrastus. He gives the same characters for distinguishing Roses as have been mentioned above, by his predecessor.

The Rose, says Pliny, grows upon a thorny rather than an herbaceous plant. It grows also upon a plant similar to a Bramble. Then it has an agreeable fragrance, but not perceptible at any great distance. The whole flower sprouts at first enclosed in a calyx full of seeds, which in a short time swells and becomes pointed at the summit, and resembles green alabastri or small vessels used for holding perfumery. Gradually the flower opens and expands itself, containing in the centre of its calyx the erect yellow stamina. He then proceeds to enumerate eleven kinds of Roses, which he says were well known to the Romans. They are the following: Rosa Prænestina, R. Campana, R. Milesia, R. Trachinia, R. Alabandica, R. spineola, R. centifolia, R. Græca, R. Græcula, R. Moscheuton, R. coroneola.

Four other kinds are mentioned by Pliny in different parts of his work before mentioned, but of these he gives no description, they do not appear to have been in such high repute as those classified by him as above, though esteemed somewhat for their medicinal virtues. The kinds thus mentioned are R. alba, pallida, præcox, spinosa, sylvestris and quinquefolia.

The eleven Roses more especially noticed by Pliny, were probably those commonly employed by the Roman people.

Of the first two of these eleven Roses, the Campanian was the earliest in flower, and the Prænestina the first which ceased blowing.

The Milesian rose was of a very bright colour, and had not more than twelve petals: it was the latest which came into blossom.

The Trachinian Rose was less red than the Milesian.

The Alabandic Rose inclined to whiteness, and was less esteemed than the above.

The R. spineola consisted of a large number of very small petals, and was the least esteemed of all.

The R. centifolia had many small petals.

The R. Græca was not truly a Rose, but a plant known to the Greeks under the name of Lychnis, and is mentioned by Dioscorides as the Lychnis coronaria. It is generally considered to have been a species of our present genus Lychnis, or Rose-campion. The description given of this flower by Dioscorides is, that it bore some resemblance in form to the white violet, and that it was woven into crowns, and hence derived its specific name, coronaria or coronal. Pliny states of the R. Græca, that in size it equalled the violet, that it grew only in moist places and was scentless.

The R. Græcula had very broad petals which were convoluted into the form of a ball, they did not expand except when forced by the hand, and presented an appearance of always growing.

The R. Moscheuton had olive-shaped petals, and grew upon a stem resembling that of the mallow.

The R. Coroneola was an autumnal Rose, and, when compared with the above, was about a middle size. The latter probably was specially used in forming garlands, especially as it is marked out by Pliny as being a fragrant Rose.

The Prænestine, Trachinian, and Milesian Roses have been hitherto regarded as varieties of the Rose, known to modern cultivators of this plant as the Rose de Provence.

Among the less regarded Roses enumerated by Pliny is the R. sylvestris. This Rose, called also by the same author Cynorrhodon, grew upon a brier having a leaf resembling the impress of a man's foot (!). Theophrastus, who also alludes to this Rose, says it bore fruit of a red colour. Among the thorns of the shoots of this Rose grew a round sponge-like substance resembling a chestnut; Pliny says it grew *especially* on the Cynorrhodon, and that it contained a grub, which produced the insects called Cantharides; a statement which had been previously made by Aristotle. In this spongy substance we easily recognise the prickly excrescences which are found more or less on all Rose trees, but most especially on the R. canina, as it grows wild in our fields, and which are produced by the Cynips Rosæ.

It has been thought that the R. sylvestris of Pliny resembled the R. eglantina or rubiginosa of Linnæus, which he for a long time referred to R. canina as stated by Fries. This Rose obtained its synonym, Cynorrhodon or Canina, from a supposition that its root was a beneficial remedy for the bite of mad dogs; an instance of its supposed curative property is credulously recorded by Pliny.

It is somewhat remarkable that Pliny has not expressly indicated among those he has noticed, the twice-blowing Roses of Pæstum, so often referred to by the Roman poets. By some the Pæstan Rose is stated as being of a deep red colour, others have said it was almost white. To these Roses and the Pæstan Rosaries, where they were so abundantly cultivated, Virgil, Martial, Ovid, and Propertius frequently allude, speaking of their abundance, fragrance, and colour, and of their blooming twice a year. There was a Rose still blooming amid the ruins of Pæstum when visited by Mr. Swinburne; and he says, in his Travels in the Two Sicilies: "The Pæstan Rose from its peculiar fragrance and the singularity of its blowing twice a year, is often mentioned with predilection by the classic poets. The wild Rose that now shoots up among the ruins is of the single damask kind, with a very high perfume. As a farmer assured me on the spot, it flowers both in spring and autumn."

The Prænestine and Campanian Roses obtained, it seems, their specific names from their localities. The Trachinian Rose appears to have been a native of Thessaly, growing near the city of Heraclea, called also Trachinia. The Milesian and Alabandic Roses derived their names, the former from Miletus, a city in the Island of Crete, where we are informed it was first found, and the latter from Alabanda, a city of Caria in Asia Minor.

We propose next to consider the modes by which Roses were cultivated, and afford such information regarding the ancient Rosaries or Rose plantations as we have been able to glean.

FLORICULTURE.

By Mr. Dickson, Florist, Brixton Hill.

THE very great improvement effected by modern cultivation in favour of Calceolarias, Verbenas, and Antirrhinums, induces me to speak a few words in behalf of their more general adoption as exhibition Florists' Flowers. Those parties who have only noticed the above as border varieties, placed singly as parterre ornaments, can have no idea of their collective magnificence when arranged in houses devoted solely to the reception of individual collections. I will venture to assert that a first-rate collection of Calceolaria, seen for the first time, would almost beggar description, the time being chosen just after they have received their accustomed watering; the house itself having thin canvas blinds in lieu of the usual glass sashes, which admits the air, yet shades the plants from the too powerful effects of the midday sun: these latter contrivances induce a mild tempered light, well calculated to show to advantage the blooming plants, with their thousand flowers of every hue and shade, trembling on their delicate footstalks as the breeze gently plays with their beauties, the soft humid atmosphere throwing on the brilliant green foliage an appearance so chaste and subdued as almost to resemble a setting of Emeralds around the more varied coloured gems. I feel assured that my description will not be found at variance with the general sensation experienced by an enthusiastic florist on surveying such a collection of Calceolarias as I would infer; and in order to place such enjoyment as I would fain depict at the command of every true lover of flowers, I will endeavour to indicate the principal points of perfection in the Calceolarias, likewise the course of treatment requisite to insure a full development of their beauties.

I beg to premise that there can be no difficulty in procuring plants of first-rate excellence for the autumn, as I have reason to know that there are an unusually large number of magnificent seedlings in this class to come out, and there can be little doubt that competition will ensure a reasonable price being demanded for them. A good compost for growing them in, four parts of turfy loam, taken from pasture land, and thrown on a heap for one year; one part of leaf mould, one part of peat or heath mould, one part of decayed cow dung, and one part of silver sand. During the summer Calceolarias require plenty of moisture; it is beneficial to the health of the plants to syringe them all over in the evening once or twice in a week before they come into bloom. A weak solution of guano water, (say, half-a-pint to six gallons of water,) will improve their growth. Give as much air as possible when the weather is fine, but they must be shaded from the scorching sun by canvas or netting: during the winter these flowers require care to keep them from damp, a little fire heat for this purpose may be brought into requisition with advantage. Give air in favourable weather, the thermometer should not range higher than from 40° to 45°. The following are the names of a few pretty good flowers, their numbers will be greatly increased. During the season I shall take an opportunity of again submitting a further list of deserving varieties. Refulgens, Van Tromp, Conrad, Ordenes, Washington, Chieftain, Venusta, Rembrandt, Vanguard, Madonna, Psyche, Van Amburgh.

The form of a good Calceolaria should be circular, a total absence of fluting is indispensable, likewise an inflated appearance of the bloom, flatness being a decided objection; colours, rich and markings distinct, size a desired excellence, but not necessarily a constituent perfection.

Verbenas.—This beautiful family are by no means difficult of cultivation; but from their great numbers it becomes rather a puzzling affair to select varieties for a small collection. I will subjoin the names of a few superlatively elegant kinds that I have myself grown to warrant my recommendation; these will be found admirably suited to pot culture; their aptitude for training knows no limit but the taste and fancy of their owners: some prefer them grown in pans, trained over trellis raised slightly above the rim of the pan; others directing their attention to the attainment of more classic forms, such as the specimen shown by Mr. Wyness, gardener at Buckingham Palace, at the June show of the South London Horticultural Society. A good compost to grow them in consists of three parts well decomposed leaf mould, one part rich yellow loam, with silver sand sufficient to colour it.

They are easily propagated by cuttings during the months of May, June, July, and even August or September; placed on a gentle heat they strike readily: when about 3 or 4 inches high they require potting off into small size 60-pots, when they will only require attention to watering and shifting to ensure good plants. The seed of these flowers should be sown in February. After the pans are properly crocked and filled with the above compost, sprinkle the seed regularly over the surface, press it down lightly with the hand, and dust a little of the compost over it, barely covering it; they should then be placed in a moist heat at a temperature from 70° to 75°. The young plants generally make their appearance in about three weeks from the sowing. The following are good flowers:—Psyche, Duval, Optimus, Duchess, St. Margaret, Robinson's Defiance, Princess Alice, Duchess d'Aumale, Mrs. Barker's Advancer, Fairy Queen, Empress of Scarlets.

ON THE CLIMATE OF BRITAIN HAVING CHANGED SINCE THE ROMAN CONQUEST.

By William Scourfield Grey, Esq., of the Temple, London.

In page 20 there is an excellent paper on British Oaks, by Mr. C. M'Intosh, in which he discusses the very interesting question, "Whether the climate of this country has changed" (for the worse,) "since the Roman invasion?" After citing several facts which seem to favour this view, he says:—"In conclusion I may add that the Roman historians, Cæsar and Tacitus, who both resided several years in Britain, affirm that the climate was in their time superior to that of Gaul (modern France), and that the vine and the olive flourished here, which in their day it did not in France."—*Vide* Cæsar de Bell. Gall., lib. v., c. 12; Vit. Agric., c. 12; and Diodorus Siculus, lib. v. ss. 25, 26.

I have looked at the passages referred to, and the one in Tacitus does not appear to me to favour Mr. M'Intosh's opinion, it is:—"Solum præter oleam vitemque et cetera calidioribus terris oriri sueta, patiens frugum, fecundum: tardè mitescunt, citò præveniunt; eâdemque utriusque rei causâ, multus humor terrarum cœlique;" thus also giving the reason—"on account of the dampness of the earth and atmosphere they grow quickly but ripen slowly." I conclude that the mistake has arisen from the translation of the word *præter*, which no doubt sometimes means "*in addition to*," or "*besides*," as also "*except*," which last is certainly the meaning to be here attached to it. Murphy, in his translation, thus renders the passage: "The soil does not afford either the vine, the olive, or the fruits of warmer climates, but it is otherwise fertile, and yields corn in great plenty; vegetation is quick in shooting up and slow in coming to maturity. Both effects are reducible to the same cause, the constant moisture of the atmosphere and the dampness of the soil." So also, in a translation edited by Richard Grenewey, fol. 1612, it is said, "The soile, setting aside olive and vine, and the rest which are proper to warmer countreyes, taketh all kinde of graine and beareth it in abundance;" and in a French translation, by Perrot, *Lyons*, 1793, it is construed, "Il n'y croît ny vignes ny oliviers, ny les autres fruits qui viennent aux pais chauds, quoyque de ailleurs elle soit assez fertile:" p. 647, thus putting the matter, so far as Tacitus is concerned, beyond doubt.

Cæsar, in the passage quoted, says: "Materia cujusque generis, ut in Gallia est, præter fagum atque abietem—Loca sunt temperatiora, quam in Gallia, remissioribus frigoribus."—Edition *Oudendorph*, 1737, which shows that, except the beech and fir, the vegetation of Britain was similar to that of Gaul, and that there were spots where the cold was less intense, which is so now. As to the vegetation *in Gaul*, Diodorus Siculus (who wrote in the time of Cæsar, and is referred to by Mr. M'Intosh,) says, "δια δε την υπερβολην του ψυχους *διαφθειρομενης της κατα τ᾽ αερα κρασεως ουτε οινον ουτε ελαιον φερει*," which is thus translated by Petrus Wesselingius, *Amsterdam*, 1745, " Excessus igitur frigoris in causa est, ut corrupta aeris temperie nec vinum nec oleum producatur."

This proves that at that time neither the vine nor the olive grew in France, so that Cæsar must be taken to except from the vegetation of Britain, not only the beech and fir, but the vine and olive *also*.

I have no doubt the error may have arisen from Mr. M'Intosh not having had the opportunity of referring to the original authors, which, on a point involving so much interest, is always well worthy of the trouble.

ON THE CULTIVATION OF INDIAN AZALEAS.

By Mr. Eyles.

This beautiful tribe of plants (some of the varieties of which are to be met with in almost every collection) seems to be very generally and very deservedly admired, and is cultivated with a greater or less amount of success, according to the acquirements and convenience of the owner.

As hard-wooded Greenhouse plants, there are few probably so easy of culture, or less impatient of bad treatment than Azaleas, when grown upon the old system of making one growth in the season, and then setting their flower-buds, which is generally accomplished in the greenhouse ; and they may be set out in the open air (in a shady situation) with safety by the latter end of July, there to remain until the cold nights suggest the propriety of bringing them back again to their former position.

But the Azalea, in conjunction with many other plants, are capable of making two or three growths in the season under a judicious system of stopping and potting. For plants intended to be grown into specimens, I would select from the nurseries or otherwise, as soon as they are in a fit condition to be moved after grafting, say about 6 or 8 inches in height ; I would prefer them with one straight shoot—the younger they are, the better—for it is impossible to build up the structure, (if I may be allowed the expression), of a good plant, without laying a proper foundation. It is not necessary that all the varieties should be grafted, as the strong growing sorts will grow much faster on their own roots ; but there are many of the most beautiful of this tribe of plants which will not survive long on their own roots, and should therefore be grafted on some strong growing varieties, such as *Phœnicia*, *Woodsii*, or *Herbertii.*

The beginning of March is the most advantageous time to commence growing them ; they should be placed in a house maintaining a temperature from 50° to 55° Fahrenheit, by night, and from 60° to 65° by day, giving air, when the thermometer rises to about 75° or 80° sun heat ; taking care that the frosty air, which often prevails at this early season of the year, does not come in contact with the plants. They should be syringed morning and afternoon on sunny days, and the house shut up early, the atmosphere of which should be kept in a humid state, by throwing a little water on the foot-paths and against the walls. The heat, when they are thus secured from the rays of the sun, acts most beneficially on the plants.

As soon as they commence growing freely (which should be in a fortnight after being placed in heat) they should be examined as to potting ; and if the roots have reached the sides of the pots they are already in, (which I should consider to be a 3-inch pot) they should be removed to a 5-inch, using for compost good hard turfy peat, with a fifth part of well-decomposed cowdung, quite free from worms, and a fifth of silver sand, with a liberal quantity of clean pot-sherds, broken rather small, and mixed up with the soil. The pots should be well-drained also with clean pot-sherds, placing a large piece over the hole, and filling up about one inch with smaller pieces ; then add a little rough peat to prevent the soil mixing with the drainage, and thereby choking it up. As much of the success in cultivating specimen plants depends on the efficient drainage of the pots, I have given the process more in detail than it would otherwise have required.

After the shifting, the house should be kept a little closer for a week or so, to assist the plants in rooting in the new soil. They should now be stopped for the first time, or, in other words, have their tops pinched off; this will induce them to send out several shoots, which should also be stopped when they have grown about 4 or 5 inches long, selecting the strongest of them to form the centre or leading shoot, which may be tied up to a neat stake.

If the plants have grown well, they will by this time require another shift (that is if the roots have come to the sides of the pots they are already in), which should be to a pot sufficiently large to allow 1½ inch cavity all round, and should be filled with the same compost as before. I would here mention that the potting and stopping should never be performed at the same time; there should be the difference of a week at the least between the performance of these two operations. On bright sunny days, the plants should be shaded for four or five hours in the middle of the day by a thin canvas thrown over the top of the glass.

Water should be applied very sparingly immediately after shifting, until the plant begins to root nicely in the new soil, which will be in the course of a week or ten days, keeping the house a little closer for that period, as before directed.

If manure water be applied, it should not be for the first two or three weeks after shifting, and then only in a very clarified state, diluted with about four-fifths of clean soft water, which should be secured by a tank in connection with the roof of the house: if applied by an experienced hand, it acts very beneficially on the plants; but if otherwise, I would not recommend the use of manure-water at all, as an undue application of it tends to consolidate the soil, and thereby renders it unfit for the plants to grow in.

Keep a sharp look out for thrips, as these generally make their appearance on the Azalea. I find the best method when the plants are small, is to go over them carefully two or three times a week, and bruise them with the finger and thumb. When large plants are infected, fumigating with tobacco every fortnight greatly checks them, by killing the young ones, but after their coats become black, I have never found the tobacco to have the desired effect.

The second growth of the plant is rarely accomplished with the same equality as the first, as two or three of the top-shoots generally take the lead; they should, however, all be stopped as soon as the strongest have gained the required length. The plants should now be formed, tying the lower branches with neat stakes regularly round the centre stem, so as to form as perfect a cone as possible, which seems to be the generally admired fashion of the present day.

As the centre shoot is stopped with the others, the strongest young shoot of the next growth should be selected to succeed it.

By shifting and stopping, upon the principles here laid down, the plants should be from 18 inches to 2 feet high, and well furnished with side branches by the latter end of September, after which they may be gradually hardened off and taken into the greenhouse to winter.

Azaleas might be kept growing all the winter, but they never make such good specimens as when grown in summer and allowed to rest in winter. While wintering in the greenhouse they will require but little water, and if possible, avoid crowding too close together, although they might stand much closer without injury than in their growing season, at which time they should never be allowed to touch each other.

About the latter end of February they should be removed again to the stove, and placed in a gentle heat ranging from 50° to 55° to start them, and gradually raising the temperature from 55° to 60° and 65° when the plants begin to grow; many of them will, no doubt, show flower-buds, which should be carefully picked out as soon as they appear, otherwise they will, to a certain extent, retard the growth of the plants if allowed to flower, and as these are always situated at the points of the shoots, pinching them out removes the necessity of stopping, which should be performed on all the remaining strongest shoots. As the first growth in the spring is generally the strongest, the young shoots may be allowed to grow a little longer than on former occasions before stopping, previous to which operation the plants should be shifted, as we suppose them to have well filled their pots with roots before wintering, and are therefore ready for shifting as soon as they begin growing in spring. Syringing should now be performed morning and evening, on sunny days, and the atmosphere of the house kept in a humid state by throwing water down, in the foot-paths and round the sides of the stage or pit, as before directed. Shading, too, must be again brought into use as the season advances. By this method a nice compact specimen may be formed in two years, and if they are not stopped later than the beginning of August, and the young wood well ripened off, a tolerable good show of bloom might be insured, for flowering late the following spring. If large specimens are required, they should be grown a third year, pursuing the same method of treatment as before, and stopping them not later than the beginning of July. After they have made their growth, the house should be kept dry and well ventilated, to thoroughly mature the wood, which will insure a good bloom the following season.

I have attached a list of good sorts, and although there are many varieties of more recent introduction, these have all been proved to be fine ones.

N.B. Those marked with an asterisk should be grafted on some strong growing kinds, such as before mentioned:—

White.

* Fielder's White
Phœnicea alba
* Gledstanesii
Elata
* Exquisita
* Variegata

Light Rose.

* Rosea Punctata
Holdenii
Murrayana

Red.

Duke of Devonshire
Prince Albert
* Lateritia
* ———formosa
Coronata
Stamfordiana
* Rubra plena
Perryana
Præstantissima
* Optima

ON THE UTILITY OF RESERVE GARDENS.

By G. T.

Few indeed are the instances I could enumerate where anything approximating an efficacious reserve department, for the purpose of preparing all kinds of suitable plants for winter forcing, and the decoration of the flower-garden, at different seasons of the year, is to be met with; and yet, a little reflection will afford convincing evidence that the majority of establishments are sufficiently extensive to require such a useful adjunct to the main garden, which indeed is obviously indispensable to the predominance of order and systematic management in every other department.

If we but glance at present circumstances, how frequently shall we find the gardener encumbered by the narrowness or the incongruity of the means at his disposal, and often, from the extent of his charge, perplexed exceedingly as to what must be done under such circumstances, or as to how his course must be shaped to successfully combat any unforeseen emergency that might arise.

It is no uncommon occurrence, now that gardening is carried out to the luxurious extent and in the varied manner it is in the present day, to meet with instances where from twenty to thirty thousand half-hardy plants, in pots, are annually in requisition for the establishment of parterres, and general flower-garden scenery, from which almost every herbaceous perennial, hardy annual, and biennial have long since been banished—indeed, were it necessary, I could particularise cases where thirty thousand pot-plants is not the maximum, and instance others where twenty thousand is the minimum quantity, that yearly must be re-propagated for flower-garden display alone; and if, in addition to this, we take into consideration the great variety and still greater store of pot-plants, essential for keeping up the summer and winter display in our greenhouses and conservatories, and the extent of pit or frame-room requisite to their successful propagation and culture; and lastly, if we reflect that all this (and, be it observed, oftentimes much besides, in connexion with the kitchen garden and forcing departments) has, in the majority of instances, to be accomplished with means inconvenient and oftentimes altogether incommensurate with the requirements of the case—if this be duly reflected upon, I think it will readily be granted that it is a state of things requiring ample amelioration, and therefore the general formation of reserve-gardens is suggested, which will not only establish the detail management on a more methodical footing, but will enable much more to be accomplished than can possibly be performed under the ordinary circumstances of inconvenience which are known to exist.

Enough has already been said, but much more were it needed might be adduced in support of the necessity of an efficient reserve department for every large establishment, and even for those of limited extent; but I will now briefly advert to the choice of a situation, extent, &c.

Local circumstances, and the particular requirements of the case must, of course, be first consulted in the formation of a reserve-garden; the extent, situation, arrangement, and utility of which should be commensurate with, and yet rendered subservient to, the main features of the establishment.

In reference to extent (although it would be advisable, or rather indispensable, to enclose a space sufficiently ample to admit of growing " specimens " of select ornamental trees and shrubs, to remedy any defect or deficiency in the pleasure-ground or the arboretum that might occur), it is not my intention to suggest the formation of a *nursery* for rearing all kinds of common shrubs and evergreens to supply the extra demand for them that might arise from extensive alterations or improvements; this being altogether a separate consideration, and one to which these observations are not intended to refer. In general, from two or three roods to two or three acres, as the minimum and maximum of extent, will be found sufficient for the purpose; but, as before observed, the sole guide in this respect must be local circumstances and local requirements. The choice of a situation, too, must often, of necessity, be greatly affected by what may aptly be designated local disadvantages, over which, perhaps, there cannot be any immediate or desirable control; notwithstanding, as a general rule, to which however there will doubtless prove many exceptions, the reserve-garden should be formed as conveniently in rear of the flower-garden as possible, or rather be situate betwixt the latter and the kitchen-garden, so as not to be far remote from either of these departments.

The chosen site should be fully exposed to all aspects (save the north-east, where shelter by trees, though at a respectful distance, would be highly advantageous), and if altogether concealed amid some extensive shrubbery or back-ground thicket of trees and evergreens, so much the better, both for the purpose of protection and concealment; the want or absence of the latter especially being often found the sole " apple of discord " in the formation of such an useful department.

The site selected should be surrounded by a wall or some other efficient fence, sufficiently high to ensure protection from the ravages of game and vermin of all kinds, and, in a general way, a stone or brick wall will be found the most suitable fence to accomplish this object satisfactorily, which is of the greatest importance when, as is generally the case, the surrounding plantations and shrubberies abound with rabbits and hares; besides, a wall of moderate height would afford considerable warmth and shelter to the garden, and prove advantageously useful in many other respects.

If the ground has been previously occupied by trees, bushes, &c., all surface encumbrances must first be removed; after which a thorough sub-soil drainage must be accomplished, and in deeply trenching over the soil to eradicate the roots of trees, &c., the surface must be levelled or reduced to an even slope.

A supply of water for the use of the garden, too, must in this stage of the proceedings be artificially secured, unless a reservoir or natural supply that can be at all times depended on, is adjacent, and even so it would both be more convenient and under control, if introduced by means of a subterraneous drain into one or more reservoirs within the enclosure, whence by a similar arrangement, the surplus fluid might flow onwards, and afford a supply elsewhere. The advantages of such a distribution of fluid where much artificial watering has to be performed, will be at once apparent; but it is an arrangement obviously depending on the nature of the ground, the local sources of obtaining a supply, &c., and the hint is generally thrown out that advantage may be taken of any perennial spring adjoining.

In predetermining upon a suitable plan or arrangement, local requirements must again decide as to how much or how little of the space should be appropriated for the erection of pits and hotbeds, or indeed for any other particular arrangement that it may be deemed requisite to make. As a general rule, however, and as being the most convenient disposition of the ground, the garden should form an equilateral or rectangular parallelogram, surrounded by a stone or brick wall seven or eight feet high.

A broad space for pits or frames should be allotted on the south and (if wanted) on the east side also of the garden; and adjoining these, the potting-shed, open shed for protecting soils, &c., should be erected. A border about 10 feet wide should run parallel to the remainder of the wall; and parallel with the border, a convenient walk, say 4 or 5 feet in width.

The internal space having a reservoir in the centre, may also be intersected with rectangular walks of a similar breadth, and the compartments formed by the intersection of the walks again, resolved into as many rectangular beds, separated by alleys two or three feet wide, as utility or convenience may dictate.

The enclosure may be rendered easy of access from any direction, by forming doorways at each angle, or in each side of the parallelogram; and to give the whole when complete, a neat and finished appearance, as well as for conveniently approaching the different compartments in wet weather, the walks and alleys may be delineated with edgings of box, or (which would perhaps be better than a live edging) with an edging of tiles, bricks, or pebbles, and then formed of gravel or coal-ashes.

Sufficient has for the present been said respecting the formation and arrangement: and I will now make a few general observations on the usefulness of such a department. As the name indicates, such a garden should contain at various seasons a reserve or stock in hand of plants of every description to supply the main features of the establishment, as well as at all times a sufficiency to remedy defects whenever or wherever they may occur. If half-hardy plants for the summer decoration of the Flower-garden are extensively in request, a proportionate amount of pit or frame accommodation must be provided for them.

Pits formed of turf-sods, and various other economical contrivances, are not unfrequently adopted for the growth and winter protection of the flower-garden stock and plants intended for forcing, &c.; and such erections are doubtless very warm, and may be made to answer the purpose for which they are intended for several years if covered in with glass, and efficaciously protected from severe frost in winter; but it is at the same time very questionable whether such temporary structures are ultimately found to be so economical as might have been at first anticipated. As far as my own experience extends, and for several years I have witnessed the employment of turf-pits and other so-called economical contrivances for protecting plants in winter, there is nothing so economical as the erection of substantial brick-pits, to say nothing of their better appearance and convenience.

As a general rule, therefore, span-roofed pits running east and west to any necessary length, 12 or 14 feet wide, divided lengthwise in the centre, and transversely, as often as may be deemed requisite by slight brick partitions, will be found the most suitable structures for the cultivation and protection of all kinds of flower-garden stock and plants not requiring fire-heat in winter.

By forming the pits span-roofed, the advantage of a north and south aspect is gained, which at different periods will be found exceedingly useful in the culture of a variety of plants in various stages of growth, &c.

A good plan to observe in the construction of these pits for half-hardy and other plants is to allow sufficient depth in the interior to accommodate very large specimens of flower-garden plants and such large plants as Hydrangea, Agapanthus, &c. Such pits would also be found very convenient for storing bulky specimens intended for forcing, for retarding plants in flower, or for slightly "hardening off" forced specimens previous to their removal to the free atmosphere of the conservatory, and a variety of purposes too numerous to particularise.

If such an arrangement is adopted, a strong portable stage or platform should be made for elevating the larger quantities of dwarf plants requisite for flower-garden purposes, pretty near to the glass when in their winter quarters, as by this means every structure occupied in this way in the winter season would be rendered available for a variety of purposes on the removal of the stage in summer.

If roses and a variety of forced plants are requisite in great numbers, and the forcing of them is to be accomplished in the reserve department, an appropriate forcing-house or heated pits must of course be erected for the purpose, and in spring and summer such structures would be just the thing for growing fine specimens of half-stove plants, as Achimenes, Gesnerias, Gloxinias, &c., and the more ornamental tender and half hardy annuals, as Balsams, Cockscombs, Globe Amaranthus, Thunbergias, &c., for decorating the greenhouses, &c., in summer. In the absence of a regular propagating house, should such be deemed unnecessary, the common hot-bed or frame will generally suffice for all the propagating required in spring; as Pelargoniums, Verbenas, and the general stock of flower-garden plants may be propagated wholesale in the open border, or, which would perhaps be preferable, on the surface of exhausted hot-beds in the summer time.

Slight hot-beds will also be required for raising half-hardy annuals and a variety of purposes besides, and it is a good plan to excavate, well drain, and pave with bricks or pebbles, the space apportioned for them.

The wall-borders of the reserve-garden will be found useful for a multitude of purposes, not the least important of which will be the adaptability of the north border for turning out and plunging a variety of plants suitable for forcing and winter decoration.

For this purpose the border should be divided into parallel beds of convenient width by narrow walks or alleys, similar to the other compartments of the garden; and the portion intended for plunging pot-plants in, should be excavated and filled up with coal-ashes, saw-dust or sand as a plunging medium; and that for planting in, if the soil is not suitable, should likewise be excavated and refilled with good turfy loam and sandy peat, but by no means manure of any kind, as too rich a compost would defeat the object in view, which is robust, sturdy growth of the plants intended for winter flowering and forcing.

A considerable portion of the west border should also be excavated and surfaced with sand or coal-ashes, as a cool receptacle for "hardening off" quantities of Salvias, Geraniums, Verbenas, &c., forming the new flower-garden stock for the ensuing year. The remainder of the west border may be devoted to evergreens in pots or tubs required for the planting of (what would otherwise be naked) parterres and flower-gardens on the lawn, and which should also be plunged in coal-ashes or poor sandy soil. The east border, or any portion of it unoccupied by plant structures, as well as other compartments of the garden may be advantageously occupied with herbaceous perennials, annuals and biennials, pinks, carnations, roses, violets, lily of the valley, lavender, &c., &c., and a variety of plants for supplying "cut flowers," and thus obviate the infliction of robbery, which for nosegays is too often practised on the flower-garden proper.

Entire rows of sweet peas should be sown and staked like other peas, for the sake of their cut flowers, and mignonette should be sown in abundance. Choice pansies, hollyhocks, and hardy annuals intended for transplantation to the flower-garden in the earliest spring, should each receive a good share of room and attention in the reserve-garden, as their utility in due season is well known and appreciated.

The garden wall will be found particularly useful for supporting a reserve of hardy climbers; and various plants ultimately intended for covering the conservative or ornamental wall, may in their younger and more feeble stages of growth, be trained out in a neat symmetrical manner.

As much of the reserve department as can be spared, should be appropriated to standard roses, a newly budded collection of which should always be in readiness to supply the frequent deficiency that is ever occurring in the rosary or flower-garden, where they are extensively employed.

The formation of handsome " specimens " of ornamental trees and shrubs, would be one of the most useful and not the least interesting purposes the reserve garden could be devoted to, for in the generality of cases there is much oversight and neglect apparent in this matter. Too often, when a handsome conifer or choice shrub of any kind either naturally dies or by accident is killed in the arboretum or on the lawn, the only resource is the nursery, where the plants are necessarily too much crowded together to assume themselves into what may be termed a specimen habit, or, if a shapely plant of anything rare is to be found, its value is of course very justly enhanced in consequence. Add to this the necessary expense and comparative difficulty incurred in removal of the specimen to a distance, and after all, as is very frequently seen, the " chances " of the plant doing well (and more especially if, as is too generally the case in our nurseries, it has ever been pot-grown,) when transferred from its sheltered quarters in the nursery, to be isolated on the lawn and subjected to the freer atmosphere of the pleasure-ground. I think all this speaks loudly for a portion of the reserve-garden being applied to the rearing of handsome " specimens " of hardy ornamental trees and shrubs, of course including conifers.

If another side of the question be glanced at, that of the indiscriminate and impolitic part-occupation of forcing-houses and plant structures generally with hosts of flower-garden stock, annuals, &c., in boxes or pots at one time, and quantities of forcing plants, as pinks, roses, &c., at another, for five or six months out of the year, as we are too frequently obliged to see the case, abundant ground (were any more needed) for the concentration of all miscellaneous affairs such as I have described in the reserve department is here found to exist, under circumstances too, not only embarrassing to the performance of business in a systematic way (from the removal from structure to structnre that must be continually making), but what is worse, absolutely detrimental to the well-doing of the rightful occupants of these structures.

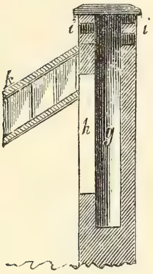
This is a truism that needs no argument to support it, for every practical gardener who has or has had the misfortune to be thus situated, can testify to the fact from dire experience. We have repeatedly seen fine crops of late keeping grapes, almost, or totally lost, through the baneful practice of introducing quantities of flower-garden stock in the late vineries towards autumn, whilst on the other hand the plants themselves were not in the best situations for their well-doing, when fire-heat became indispensable for the preservation of the grapes from the very effects which those plants, by their introduction in the vinery, had been mainly instrumental in causing, or if not mainly instrumental, had at least by the cold evaporations arising from their being watered, &c., materially assisted any tendency to decay which the fruit might have otherwise acquired, or become susceptible of.

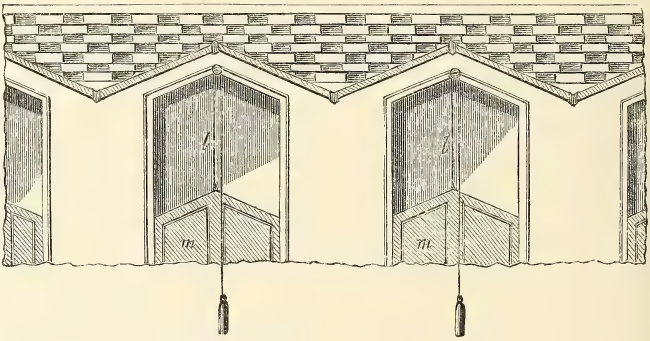
By the introduction of plants into the early fruit forcing-houses too, it is no uncommon thing to see peaches, cherries, &c., infested with aphides and other entomological vermin, introduced with roses, pinks and other plants; for despite the exercise of the greatest vigilance on the part of the gardener, let but units of these pests gain a footing, and millions, aye, tens of millions, will soon colonise themselves, unless the most unremitting perseverance is adopted to exterminate them (and this being a work of much time and trouble, when enough besides can generally be found to do): it follows therefore, that " prevention is better than cure." Nor are the evil results of the practice, or rather of the *necessity* which compels gardeners thus to crowd their forcing-houses in winter and spring, confined to the forcing structures alone; the plants introduced into them are not in their proper sphere; for be they ever so healthy and robust at first, undue excitement and etiolation and their natural consequences, exhaustion and debility, must, undoubtedly, be the lot of half-hardy plants that ought to be enjoying comparative rest and hardihood by full exposure in cold pits or frames. Plants intended for forcing too (even though they experience the full benefit that every ray of winter sunshine can confer upon them,) are seldom what we would have them to be. How much less then, can we expect them to be in accordance with our wishes, when *blanched* (not forced) beneath the shade of vines and figs and peaches !

VENTILATING OF FORCING-HOUSES.

Proper ventilation is of the first importance in a forcing-house, for much depends upon the means adopted for this purpose in forcing any kind of fruit: indeed, without thorough ventilation and some method by which it may be graduated to any degree required, the gardener may use every other effort for the successful growth of fruit in vain; for no attention to the proper soil—to heating—and watering, &c., however complete, will succeed to a degree of perfect satisfaction, unless the house is properly ventilated.

Considering this as a fixed principle, we would observe with regard to summer vineries, Pine-houses, &c., where flat sloping lights sliding on the rafters are used, that the present and old fashioned method of sliding the lights up and down, is, perhaps, the best system for affording proper ventilation; but for early and late vineries, cucumber and melon houses, where the ridge and furrow principle is employed, the ventilation is more complicated and should be fully considered. For this purpose we subjoin four figures (to a scale of $\frac{3}{16}$ of an inch to a foot,) illustrative of the ventilation of a vinery, which, preserving the same principle, may be varied and applied to any other description of forcing-houses.





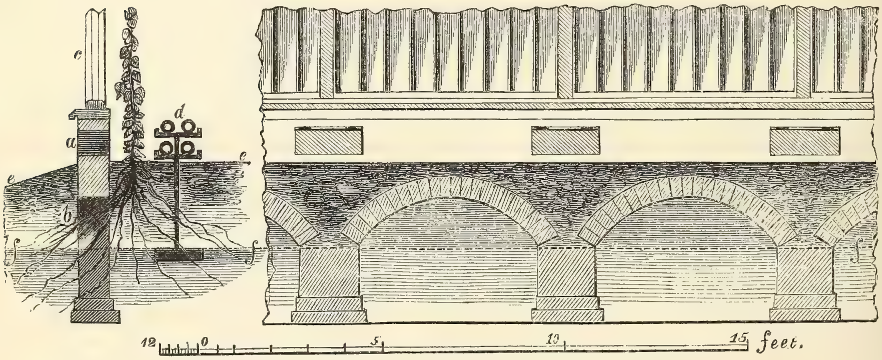


Fig. 1. is a section of the front wall in which *a* is the front ventilator; *b* the archway through which the vine roots pass out to the front border; *c*, the front lights; *d*, the heating pipes supported by cast-iron standards every 8 or 10 feet apart, and batted with lead into a solid stone. The sloping front border and inside bed, are represented at *e*, *e*. Here the ventilators in front are on the same level as the front pipes, so that the cold air may diffuse the heated air from the pipes through the house. This figure shows a section of the footings, crown of the arch, coping and plating, &c. The ground level and general surface is represented at *f*, *f*.

Fig. 2. is an elevation of a portion of the front, which shows the arches, ventilators, and a part of the upright lights in front. The vines are planted opposite the centre of each arch, in the middle between the ventilators, so that no *direct* cold air can be blown against the stems. These ventilators are hinged on the upper edge, and kept open by an iron stay. When a thorough draught is desired to cool the house suddenly, then the upright lights which are balanced on the pivot and socket principle, may be opened in addition to the ventilators, but for all ordinary occasions the ventilators alone will be sufficient.

Fig. 3 is a transverse section of the hollow back wall which shows the vacuity (*g*), the ventilators (*h*), the pigeon hole openings to the front and back (*i, i*), and a portion of the ridge and furrow roof (*k*). The vacuity commences below the level of the ventilators, in order to give capacity for a greater volume of air than can pass through the ventilators at one time.

Fig. 4 is a longitudinal section of a part of the roof, and elevation of the back wall. This figure shows the ventilators (*l, l*), with the shutters (*m, m*), put down to their full extent. There is a moulded frame placed round the openings of these ventilators, with a groove in it for the shutters to slide up and down. The line by which the shutters are moved is attached to the centre of the top, and passes over a pulley fixed to the top of the moulded frame, and nicely balanced by a leaden weight, so that the shutters will remain stationary at any height desired to regulate the ventilation.

The elevation of the wall above the roof, shows the manner in which the air is admitted by the pigeon holes to the vacuity; and the north side of the wall should be perforated in the same way above the roof, taking care that the openings on one side are opposite the solid brick walls on the other, to prevent a direct draught through. The openings on the north side must take the same form of outline as those on the south; that is, there must be no opening behind, opposite the inside of the house in front.

This system of ventilation is the best at present known, and may be applied to all kinds of forcing houses on the ridge and furrow principle, whether there are upright lights in front or not.

ON SOME EXPERIMENTS IN THE CULTIVATION OF THE VINE.

By William Tillery.

There have been so many treatises and articles in periodicals on the cultivation of the vine lately, that little now can be added on the subject, yet we hear a deal of the bad colouring of the Hambro', the difficulty of setting some of the shy sorts, and the crackling and spotting of the thin-skinned varieties, so that there is still something to be learnt in the matter. The following remarks on some of the above difficulties are the result of experiments, tried at Welbeck within the last three years, and may be of some interest and use to some of the readers of the "Magazine of Gardening and Botany," who have not the means or time to experimentise for themselves. As the flavour of grapes depends principally on the soil they grow in, I planted some large Hambro's in 1847, in a chamber of the border, to try the effects of different kinds of manure on the flavour and colouring of the fruit. The first compartment was formed principally of turf from a limestone rock, mixed with charcoal dust; in this the grapes coloured well and were fine in flavour, but had not very large bunches or berries. The second compartment was formed of half-rotten manure and charcoal; the fruit in this were bad-coloured, and the juices watery and slightly acid; another peculiarity was that the stones in the berries never hardened. The third compartment was filled with soil in which carrion and slaughter-house garbage had rotted in. Here the berries and bunches were large, but of a red colour, and the flavour of a peculiar offensive kind. The fourth compartment was filled with turfy loam from an old pasture, and mixed with leaf-mould: lime-rubbish containing brickbats and burnt clay formed the subsoil on the top of the drainage; in this compartment the bunches were fine, some of the berries measuring 3½ inches in circumference and well coloured. In all the four compartments the roots were confined, and had to feed on the soil contained in them; it will be seen by the above that vine borders may be made too rich with azotised substances, and that although large plethoric berries may be obtained, they will be worthless as far as regards colour and flavour. When Mr. Dowding was gardener to the late Sir Simon Clarke, of Oakhill, near Barnet, he made his vine borders from the turfy sward of an old pasture field, the sods were ridged up in the winter and frequently turned in frosty weather, when sheep were folded on them; this compost was mixed with road scrapings of a flinty nature; perfect drainage was another feature of his system, and the Black Hambro's he grew and exhibited at the Chiswick shows have never been surpassed yet, some of the bunches weighing from 6 to 8 lbs. After making a good border and having healthy young vines raised from eyes planted, Mr. Dowding always avoided the rock that many cultivators split on, namely over-bearing his vines when young. His system was to let them be at least five years old before he took a full crop off them. It is certainly pleasing to see vines show well when two or three years old, and few can withstand the temptation of letting a few bunches remain, yet it is a great error, and more young vines are ruined by over-cropping than any other management.

To show how much the vine is influenced by soil, I may here state that the original vine of the Black Damascus, at Worksop Manor, grew near a heap of old coal ashes and prospered amazingly as soon as its roots struck into them; in forming a border to grow a house of the same variety here, I made it very light with coal and wood ashes, and they have grown as well as could have been desired. This variety is one of our noblest black-grapes, being thin-skinned and having a rich vinous flavour, but it is in general a shy bearer and uncertain setter; here, however, it is as prolific as the Black Hambro, and forms fine bunches of large perfect berries. At Welbeck, most of the grapes are grown in chambered borders, and we have as much control over their roots as far as regards watering, drainage, and covering, as if they were grown in pots.

The berries of the Chassales Musque, another excellent white grape, is very apt to crack at the ripening process; this may be quite or partly prevented if it is grown in light soil and well-drained border, and kept rather dry when ripening; this can be easily done when grown in chambered borders, for a thorough control is then to be had over the roots.

I never find any difficulty in setting the Black Damascus, Dutch Sweetwater, Horseforth's Seedling and the Muscats; by keeping a rather dry temperature at the time of flowering, and brushing over the bunches with the hand at the driest and warmest time of the day, the capsules are disturbed and the pollen dispersed; when time can be spared it is a good plan to thin out some of the unopened flowers in the inside of the bunches of the Black Damascus and Muscats, it strengthens the others left and they set better.

As good new seedling grapes are rare (indeed it is hardly possible to excel some of the old sorts), one that has lately made some sensation, named Josling's St. Albans, has fruited a bunch with me; it is apparently of the same parentage as the Chassales Musque, namely a cross between the white Frontignac and the Sweetwater, and will I fear have the same fault of cracking—the flavour likewise is similar to some new kinds of Muscats. Other grapes picked up by Mr. Rivers on the continent have been sent me by that gentleman to prove, but I have only as yet succeeded in fruiting a small hardy black grape named Hatif de Jura; it ripens a week or two before Miller's Burgundy, and bears finer and larger bunches, and will succeed well in ordinary summers in the midland counties on open walls and cottage gables, it has the peculiarity when ripening of colouring in spots and patches. Another new grape I had from Portugal, under the name of San Jasse de Santarem, is an excellent early black grape with large loose bunches and flavoured like the purple Constantia.

A late white grape is grown here under the name of the Trebiana, marked to have come from Mr. Beaton; it hangs a month after the Muscats and nearly as late as the West's St. Peter's, and is therefore desirable on that account; it seems to have originated between the Muscat and Syrian, and is not a bad grape when perfectly ripe.

MISCELLANEOUS.

New and Rare Plants in Flower. *Fuchsia corymbiflora alba.* Believing as we do the attractive and elegant genus Fuchsia , notwithstanding the varied beauty of the species and varieties already under cultivation, is susceptible of much improvement, both in kind and culture, we have long desired to see some addition to the corymb-flowering species especially, and therefore rejoiced to meet with a white flowering one at the July exhibition of the Horticultural Society, produced by Mr. Salter, Nurseryman and Florist, at Hammersmith and Versailles, who raised it on the continent.

To contrast it more effectually with the parent species, *F. corymbiflora,* a plant of the latter grafted with the white variety was exhibited, and we must certainly pronounce the contrast of the red and white inflorescence a pleasing one, and whether in the grafted state or when growing on its own roots, it will undoubtedly be found an interesting companion to the former.

In habit it is somewhat more shrubby than *Fuchsia corymbiflora,* the constitution equally vigorous, the foliage broader and of a lighter glossy verdure; with respect to the inflorescence, the racemes are fine, the tubes of the flowers of a carneous whiteness, which Mr. Salter states exists only whilst the flowers are young, becoming, he says, pure white when fully developed. The sepals are well reflexed, exhibiting a corolla of brilliant crimson. Altogether, it is a distinct variety and merits a place in every collection of this beautiful family.

Whilst on the subject of Fuchsias, we cannot help observing, that the last exhibition of them was, collectively, very inferior to what they might have been; and the same observation is applicable to every exhibition of this popular tribe we have had the misfortune to witness this season. *A really handsome well-managed specimen* we have not seen either at the Horticultural or the Royal Botanic Society's floral fêtes this year; which is a matter of much surprise, when their great popularity, attractive beauty, great variety, graceful habit when well grown, and easy culture, are taken into account. A nice little plant, present at the last Chiswick flower show, successfully grafted with fifteen sorts, the major part of which were in flower, is sufficiently indicative of what may be accomplished by grafting alone; but we cannot conceive why there should not be produced handsome standards of the more robust kinds, various in height, having proportionate heads profusely hung with white and coral blossoms; and equally beautiful pyramids of the more delicate varieties from six to ten feet high, profusely furnished with gracefully drooping branches and branchlets from base to apex, and these bespangled with elegant pendant flowers down to the pots they grow in, which ought and *would,* if the plants were *well grown,* be partially concealed by the gaily decorated, gracefully hanging spray.

What has been accomplished with pot roses is now a matter of history. The varied beauty of Pelargoniums is too universally known and appreciated to require fresh eulogy; and if evidence be needed of the improvement of form of which we deem *them* susceptible, the great conservatory in the Regent's Park could furnish it; and as for Fuchsias (whilst we are well aware that " specimens," deserving the name of such, *do* exist in the vicinity of the metropolis, but somehow are not forthcoming on exhibition days), we must say, that we think if Messrs. Rogers, of Southampton, were to adorn the metropolitan exhibitions with such specimens as we have known them to exhibit at home, as great a *furor* would be created by Fuchsias in June and July, as the gorgeous splendour of the Indian Azaleas produced at Chiswick in May last.

Salvia patens alba. As *Salvia patens* is valued and admired for its blueness, so the subject of our present notice will become a favourite from its whiteness. In foliage, robustness of habit and general appearance, if we except the inflorescence, it is of course, as the name imports, but a counterpart of *S. patens.* The flowers are equal in size to the latter, and of a snowy whiteness, having, however, an inconspicuous tinge of a pale blue (which enhances rather than detracts from its merit) in the centre of the lower lip of each flower. It will doubtless be found a useful acquisition to the flower garden, and all the more desirable for being a *white* Salvia patens. We noticed it in flower in the collection of Messrs. E. Henderson, St. John's Wood Nursery.

Torenia asiatica. Of all the various methods of cultivating this charming plant, whether as a compact greenhouse bush, as a specimen trellis plant trained over shield-like or balloon-shaped supports in the warm conservatory, as a basket specimen, epiphytally suspended like an Æschynanthus or an Orchid from the rafters of the stove, or even grown (as we have seen it in Devonshire) as a summer flower-garden plant in the open air; apparently the most natural, really the most suitable purpose to devote it to, is to afford it a situation where comparative shade from the rays of the mid-day sun, and a plenitude of atmospheric and terrestrial humidity are the attendant conditions which surround it throughout the period of its summer life.

Of the certainty of this we were forcibly reminded a short time back, by the inspection of a small stove, or stove conservatory, in Messrs. Weeks's Nursery, Chelsea, in which was a small reservoir, in part surrounded by rockwork overhung with the inmates of the stove growing at the back or planted in the interstices of the rock; and conspicuously lovely amongst and beneath them was *Torenia asiatica,* which under none of the methods of cultivation above alluded to, have we ever seen appearing so much at home, or presenting half so beautiful an appearance as it did with its long, trailing, quadrangular shoots ramifying in the rudest health downwards over the rockwork to the water's edge, and displaying a profusion of its bluish rich purple-blotched ringent flowers.

Intermingled with exotic Ferns and Lycopods, beneath the shade of Arums and sub-aqueous Endogens of ample growth, many a barren and formal-looking in-door Aquarium might be made to smile with exotic forms and tints, and thus be rendered what *all* such objects should be—rare as well as beautiful.

Jacaranda mimosifolia. We recently saw this beautiful Bignoniaceous plant in bloom in a very dwarf state at Messrs. Knight and Perry's Exotic Nursery, Chelsea, and we are only surprised that such a really fine old plant (which has been introduced from Brazil thirty years at least,) should not be more generally met with in a blooming condition.

Alluding to the comparative merits of the beautiful old *Relhania squarrosa* exhibited at the July meeting of the Horticultural Society, Professor Lindley happily connects neglected " old plants " generally with the simile of " old wine and old nobility," and we think he does so most appropriately. The Mimosa-leaved Jacaranda may be included in the much-overlooked, nay, almost discarded phalanx of " old plants " that are now, it is gratifying to witness, about to receive the homage due, but long delayed, to long neglected merit.

We are not unmindful that much of the neglect which has befallen the interesting subject of our notice has arisen from the general but erroneous impression, that much room for root and branch-extension is *indispensable* to its successful management, and to flower it well; but a greater mistake with respect to the treatment of this plant could not be committed, than to dispose it in *too* deep or too fertile a soil.

Planted out in the border of a warm conservatory, with plenty of head-room, it will undoubtedly attain a tree-like size; but to flower it well under such circumstances, it must be skilfully treated, the rooting medium must be circumscribed in extent, sterile in quality, and rendered tolerably dry in the winter season by thorough drainage, and a limited supply of moisture. It is a good plan to commingle plenty of lime rubbish, broken bricks, &c., with the soil to assist in preserving porosity and ensuring dryness; treated thus, and care taken that it does not become *too* dry in summer, this fine old neglected plant will assume a most attractive appearance by displaying its azure blue panicles of Penstemon-like flowers in profusion, and amply repay the " trouble " bestowed upon it.

On the other hand, as if consulting the convenience of small structures and less ample means, this accommodating plant will succeed admirably, grown in pots of a limited size and a soil not over rich; turfy loam and sandy peat commingled with an equal quantum of coarse gravel and good bottom drainage, suit it well, when placed to grow in a rather warm greenhouse or heated pit with a sufficient drought in winter, and a plenitude of moisture at the root during the active season; if thus judiciously treated, it will copiously unfold its delicate flowers of " soft cerulean blue " by the time it is 18 inches or 2 feet high. The former was the height of the plant we saw in flower at the Exotic Nursery, Chelsea; and we confidently commend *Jacaranda mimosifolia* to the fostering care of " specimen " plant cultivators especially, for nothing would afford us greater pleasure than to meet with it in a *respectable* state at the exhibitions of future seasons.

Ruellia. Of the above, a new and pretty species was produced at the July flower-show of the Horticultural Society by Messrs. Veitch of Exeter, who, with scarcely an exception, introduce novelties possessing a greater or less degree of merit to public notice at every Metropolitan Exhibition; a worthless new plant, indeed, being scarcely ever " brought out " by these gentlemen.

The subject of our notice is a kind of half shrub, with bluish violet flowers, produced solitarily in the axillæ of the opposite, entire, rich green foliage. The flowers, which are freely produced, are an inch or more across, with a deep purple throat and much resemble a Petunia in appearance. A kind of half-stove or warm greenhouse suits it best. Introduced by the Messrs. Veitch from Peru. Also from the same gentlemen's Nursery at Exeter, a fine plant of the beautiful *Saccolabium Blumeii,* displaying five or six of its lovely pendant flower scapes.

Messrs. Veitch also exhibited at the same meeting a collection of new hardy Conifers in pots, consisting of *Taxodium Horsfieldii, Abies Brunoniana, Pinus Gordoniana, P. Winchesteriana, Thuja Doniana* and *Dacrydium Franklerii,* all of which (although much too young to form any correct estimation of their ultimate appearance) appeared very ornamental, and doubtless if quite hardy (as was stated to be the case) will prove desirable additions to the Pinetum. With the foregoing was a new species of that exceedingly ornamental, hardy coniferous genus Cryptomeria, sent home from Japan, by their collector Mr. Lobb; the habit of which although not very strikingly different from the common form of Cryptomeria (whilst it appeared to us equally as branchy and luxuriant though not so glaucous), seemed more sturdy and robust in all its parts.

Gloxinia Wortleyana. A remarkably fine plant of this very lovely Gloxinia we recently noticed in the collection of Mr. Glendenning, Nurseryman at Chiswick, displaying its pure white and beautifully tinted flowers in profusion. The same specimen was produced at the last Chiswick Exhibition and excited universal attraction amongst the visitors, many of whom we heard commenting very encomiastically upon its delicate beauty. Also at the Chiswick meeting, from the same gentleman's Nursery, a collection of new hardy ornamental shrubs in pots, comprising the evergreen plum from California (*Cerasus ilicifolia*), several species of Ceanothus (*C. dentatus, C. rigidus,* and *C. pappillosa*), together with *Rhamnus Oleifolius* and a new species of the same genus.

The above will be found interesting subjects for the Arboretum or the Conservative wall.

Petunia " Count Zichy." This is a very beautiful Petunia and well adapted for pot cultivation, training over a wire trellis, &c. The flowers are of intermediate size, the ground colour deep rosy crimson, clouded towards the limb-margin of the corolla with glowing purple, and having a good light centre, the throat being distinctly striated with dark pencillings. Some of the flowers eventually become rosy crimson selfs, and (interspersed with the darker ones) produce a very pretty appearance in contrast with the bright verdure of the leaves.

Blooming in the Nursery of Messrs. E. Henderson, Wellington Road.

Petunia "Regina." Stated to be a seedling of the current year, raised by Mr. Boff, St. Paul's Road, Balls Pond, who produced it at the Chiswick Flower Fête last July. It is a fine seedling, the flowers individually very large, and variegated in a peculiar manner with purple and rosy crimson.

Metrosideros robusta or *polymorpha.* A distinct and very robust growing conservatory bush or conservative wall plant, with good foliage and ruddy crimson inflorescence, produced in the manner peculiar to most *Myrtle-blooms.*

Professor Lindley states, in his highly scientific work the admirable "Vegetable Kingdom," that the heavy, hard, dark-brown timber which furnishes the South Sea Islanders with their clubs and other weapons, is said to come from this or some allied species of Metrosideros. We lately saw it in flower in the collection of Messrs. Rollisson, Nurserymen, Tooting. It is a desirable species, and will doubtless be found an ornamental evergreen for such purposes as those above alluded to.

Astelma eximium. Here we have another "old" plant deserving of much more attention from cultivators than it usually experiences at their hands, but having met with a tolerable specimen or two in our peregrinations this season, we are induced to hope that brighter days are yet in store for it, and trust that at no distant date it will be deemed worthy of being juxtapositioned on the stages of Chiswick and the Regent's Park, with the very beautiful (and likewise long neglected) but now exceedingly well managed Crassulas, appropriately renamed Kalosanthes.

This very beautiful *everlasting* is the best of its genus, and even under the condition of mediocrity we mostly meet with it, its globose heads of rich crimson inflorescence contrasting with its pubescent, glaucous stems and leaves, compose an object of no inconspicuous beauty. How much more, then, would its attractive appearance become enhanced when grown in well balanced specimens by judicious cultivation, as well filled up, as dwarf, and as bushy as the finest plant of Kalosanthes ever produced by Mr. Ayres, of Brooklands?

A fair managed specimen of this fine old plant was produced at the July exhibition of the Horticultural Society by Mr. Bruce, gardener to B. Miller, Esq., Collier's Wood, and a similar one by Mr. Cole, of Dartford, at the Royal Botanic show on the 4th of the same month. Some excellent directions (accompanied by a plate) for the culture of this much neglected plant are given at p. 104, Vol. v., of our Magazine of Botany, to which we must refer our readers, inasmuch as nothing can be better than the instructions there inculcated.

American Plant Exhibition in the Regent's Park, &c.—The principal flower fêtes of 1849, with all their delightful associations and reminiscential charms, are now gone by, to be renewed, we trust, in each successive future season with additional ardour on the part of exhibitors, and enhanced attractiveness in the exhibitions.

The beauty of the ordinary exhibitions of the Horticultural and Botanical Societies of London, held respectively thrice in the year at Chiswick and the Regent's Park, are now so well known and appreciated, that to descant anew on the attractions which belong to them, or the utility which they engender, might justly be deemed superfluous. Such, however, is not our intention, but want of space hitherto having alone prevented our making some allusion to an additional exhibition of flowering plants afforded to the public by the arrangements of the Royal Botanical Society,—we mean the display of "American plants," held for the first time in the Botanic Garden, Regent's Park—we now refer to our note-book, that we may record a few observations respecting it.

An arrangement having been made with the principal growers of Rhododendrons, &c., in the vicinity of the metropolis, nearly an acre of ground, very appropriately situated, was selected in the Botanic Garden, Regent's Park, for the disposition of the plants composing the exhibition, which were mainly supplied from the "American" nurseries of Messrs. Lee, of Hammersmith; Standish and Noble, Mr. John Waterer, and Mr. Baker, of Bagshot; and Mr. H. Waterer, of Knaphill, near Woking. The ground surface of the chosen site, already pretty uneven, was further and skilfully diversified under the direction of Mr. Marnock, and rendered as judiciously undulating and irregular as was deemed compatible with the effect intended to be produced (which was, of course, as imposing a *coup d'œil* as could be obtained from the more elevated points of view). This unevenness of the ground, therefore, was much enhanced, and superficial monotony effectually obviated by resolving the area into numerous unequal divisions (both to suit the convenience of the exhibitors as well as produce effect), and throwing back the ground more or less on every side from towards the centre until the whole resembled a very irregular amphitheatre, with a small reservoir containing aquatic plants (which we presume previously existed there) towards the centre.

Small elevations for disposing the finer standard Rhododendrons individually were "thrown up" here and there, with the happiest results imaginable.

The planting done and principal arrangements all complete, the whole artificially covered in, formed one huge "ridge and furrow" tent; the reservoir and different compartments delineated with margins of turf, and the mounds for standards "grassed up," gravel walks were made to traverse and intersect the whole arrangement, imparting a life and warmth to the evergreen mass which gravel alone can give.

This was the state of things when we visited the exhibition in April and May.

Renewing our inspection several times in June, the principal portion of the plants were, of course, in bloom, and a more gorgeous assemblage of rich tints, contrasted with every shade of green, we have never beheld. The *coup d'œil* from the eastern entrance, where the ground was highest, was not only beautiful, but magnificent—presenting here a mass of crimson, there a mass of white; now a breadth of golden yellow, now a mass of purplish-crimson; the whole exquisitely blended together by the different modifications of these colours, intermingled with the greens of the foliage, produced what may, without a shadow of fulsomeness, be termed a perfect "blaze of beauty," the effect of which was in no small degree heightened by the subdued light under canvas, and the diversified irregularity occasioned by the appropriate introduction of standards varying from six to ten feet high, with proportionate heads superbly clad with the most gorgeous inflorescence; and, as before observed, some of the handsomest of these beautiful objects were conspicuously located on grassy mounds, elevated some two or three feet above the surrounding ground level, and with the very happiest effect.

Great credit is due to the Royal Botanic Society's curator, Mr. Marnock, and the gentlemen who supplied these "American plants," for their skilful and enterprising arrangements respectively. Nor need we stop to inquire into the origin of this new exhibition, inasmuch as it will readily be inferred that the primary object could be no other than the deserving introduction of a richly varied but not half sufficiently patronised tribe of hardy ornamental plants more immediately to public notice, thereby providing a rich feast for those who love to gaze on "flowers of all hue," on the one hand, and inducing the more extensive patronage of those who mainly obtain a livelihood by the nursery cultivation of them on the other. All who desire, therefore, that success may attend one branch of Horticulture as well as another, must concur with us in wishing well to such an exhibition as that which we have attempted to describe, and rejoice to know, moreover, that it has been eminently successful.

Vegetation of the Peninsula of Aden. The south-west point of Arabia Felix is terminated by three remarkable promontories, which, proceeding from east to west, follow each other in this way—Cape Aden, Cape Antonio, and Cape Babel-Mandeb. The eastern promontory, Aden, forms a heart-shaped peninsula, of which the diameter from east to west is one mile and a half (German); and is connected with the main land by a low sand-bank, which is under water during the spring tides. The indigenous plants are, on account of the aridity of the ground and air, limited to a few of the desert. Cultivation is out of the question, for want of means of irrigation. The largest tree is Sterculia urens, which occurs sparingly in the deep recesses on the western shore. Poinciana elata and Acacia planifrons appear likewise, of considerable size in bays of difficult access. Most of them are felled at an early age; Balsamodendron Opobalsamum, Euphorbia triaculeata, Capparis carnosa, Cadaba glandulosa, continue shrubby, covering beds of torrents; Cassia lanceolata and angustifolia, Gynandropsis pentaphylla, Cleome angustifolia, Anastatica Hierochuntica, Psoralea bituminosa, Indigofera sp., and Statices sp., are among the scanty, stunted vegetation which is met with in more protected situations, affording some appearance of verdure during one half of the year. Corn and vegetables, as well as fodder, have all to be imported, partly by sea, from the African coast, and partly, in times of peace, from the Continent. The coast to the westward, is less barren than at Aden; here are seen groups of Palms and of shrubs, consisting probably of Rhamnus Napica, and Acacia planifrons. The Akrabbi-Bedouins pursue some sort of agriculture far inland, out of the produce of which they carry to Aden the grain and straw of the Durrha. Excellent grapes ripening in May, oranges, lemons, figs, plantains, and dates, are brought from a short distance from the town of Lahadash, to the north-west of Aden, where market supplies are yearly improving. The great demand, and the lucrative sale of the produce of Aden, have already had a most beneficial influence on the neighbouring Bedouin tribes.—*Hook. Jour. of Bot.*, 216.

Vegetable Ivory. The first notice of the existence of the Vegetable Ivory Palm was given by Ruiz and Pavon in 1798. There under the name of Phytelephas Macrocarpa, the following particulars are given amongst many others of its names and properties. It is called Pullipunta and Homero of the Indians, of the hot and low valleys of the Andes of Peru, about Chanchamoya, Vitor, Cuchero, and San Antonio de Playa Grande, its native locality, and Palma del Marsel and Marsil Vegetal by the Spaniards. The fruit at first contains a clear insipid fluid with which travellers allay their thirst; afterwards this same liquor becomes milky and sweet, and it changes its taste by degrees, as it acquires solidity, till at last it is almost as hard as ivory. The liquor contained in the young fruit turns acid if they are cut from the tree, and kept some time. Bears devour the young fruit with avidity, and when full grown, the largest measures about 10 inches across, and 25 in circumference.

The Cultivation of Roses. Peat soils, although not of the best kind for Roses, are found to grow them tolerably well. For the improvement of such if wet, the first effort should be to drain them. After this, stiff loam or pulverised clay, and burnt earth, may be brought upon the surface, digging 2 spit deep, and well mixing the foreign substances with the natural soil, as advised in the improvement of clay-soils.

The worst soils for roses are those of a sandy or gravelly nature. In such they often suffer fearfully from the drought of summer, scorching up and dying. Soils of this kind are sometimes bad beyond remedy. The best plan to pursue under such circumstances, is, to remove the soil to the depth of about 20 inches, as the beds are marked out, and fill up again with prepared soil Two-thirds loam—the turf from a pasture, if attainable—and one-third decomposed stable manure will make a good mixture. If a strong loam is within reach, choose such in preference to others, and if thought too adhesive, a little burnt earth or sand, may be mixed with it. A good kind of manure for mixing with the loam, is the remains of a hot-bed, which has lain by for a year, and become decomposed. Opiox, a French apothecary, attributes the superiority of the Roses grown for medicinal purposes, in the neighbourhood of Provins, to peculiar properties of the soil, which contains iron in considerable quantity.—*Paul's Rose Garden*, 28.

NEW AND BEAUTIFUL PLANTS FIGURED IN THE BOTANICAL PERIODICALS.

Alloplectus capitatus. *Capitate Alloplectus.* A very beautiful plant, both in foliage and flowers ; the flowers are of a large size, each leaf measuring from 10 inches to 1 foot in length, of the richest possible velvety or silky hue ; the upper side deep-green, verging to yellow, the under side purplish, while the stem and petioles, peduncles, and calyxes, are of a rich crimson blood colour. It is a stove plant requiring a warm moist situation, and to be potted in a loose peat soil, and carefully watered during winter. It is supposed to be a native of tropical America, and its flowering season is March and April.—*Bot. Mag.*, 4452.

Amherstia nobilis. *Splendid Amherstia.* Ever since the publication of this plant in Dr. Wallich's *Plantæ Asiaticæ Rariores*, the greatest desire has been felt by cultivators in Europe to possess it. His Grace the Duke of Devonshire had the honour of importing the first living plant in 1837, through the medium of his collector Mr. Gibson, and this is become a noble and vigorously growing specimen in the stove at Chatsworth, but has not yet shown any signs of flowering. Lord Hardinge, whilst Governor General of the East Indies, presented a fine plant to Mrs. Lawrence of Ealing Park, Middlesex, under whose management it flowered in April, 1849, when only 11 feet high. It should be potted in a mixture of peat and loam; be encouraged with a little bottom heat to its roots, and be carefully shaded from the hot rays of the sun. Dr. Wallich's account of his first notice and discovery of this magnificent tree is as follows :—" The first notice I had of the existence of this magnificent tree was at Rangoon, in August, 1826, when Mr. Crawford favoured me with some dried unopened flowers, and a leaf of it, with the information that he had gathered it in a garden belonging to a monastery, around the hill at Kogun, on the Saluen River, in the province of Martaban, where they appeared too beautiful to be passed unobserved even by the uninitiated in Botany. Handfulls of the flowers were found as offerings in the caves, before the images of Buddha." In March, 1827, Dr. Wallich accompanied the British Envoy to Ava, and in his official report of a journey on the River Saluen, in order to examine the site and capabilities of the Teak forests in that direction, he thus writes : " In about an hour I came to a decayed Kioum (a sort of Monastery), close to the large hill of Kogun, distant about 2 miles from the right bank of the river, and 27 from the town of Martaban. I had been prepared to find a tree growing here, of which an account had been communicated to me by Mr. Crawford, and which I had been fortunate enough to meet with for the first time a week ago at Martaban. Nor was I disappointed. There were two individuals of this tree here ; the largest about 40 feet high, with a girth, at 3 feet above the base, of 6 feet, stood close to the cave; the other was smaller, and overhung an old square reservoir of water, lined with bricks and stones. They were profusely ornamented with pendulous racemes of large vermilion-coloured blossoms, forming superb objects, unequalled in the flora of the East Indies, and I presume, not surpassed in magnificence and elegance in any part of the world. The Birman name is *Toha.* Neither the people here, nor at Martaban, could give me any distinct account of its native place of growth ; but there is little doubt that it belongs to the forests of this province."—*Bot. Mag.*, 4453.

Cyrtochilum citrinum. *Lemon-coloured Cyrtochilum.* This has a good deal the habit of the *Cyrtochilum filipes*, but the scape is less slender, the flowers larger, of an uniform pale-yellow, or lemon-colour, with a different shaped lip, and a prominent and very conspicuous tooth on each side of the short column. It was imported from Central America, and thrives in the cool division of the Orchid house, placed in a basket of loose turfy peat and moss, and suspended from the roof. —*Bot. Mag.*, 4454. [It is nothing but *Oncidium concolor.*]

Epimedium pinnatum. *Pinnate-leaved Epimedium.* A most lovely little hardy herbaceous plant with flowers in form, and size, and colour, resembling some *Helianthemums*, but, when they are inspected, the curious structure of an *Epimedium* may be detected. It is a native of the shady mountain woods in Gilan, a province of Persia, where it was first detected by Hablitz. It has since been found in the Caucasian region, on Mount Talusch, between Lenkoran and Sunant, at an elevation of 2400 feet above the level of the sea.—*Bot. Mag.*, 4456.

Mormodes lentiginosa. *Freckled Mormodes.* A new and very remarkable species of *Mormodes*, obtained from Central America, and flowered in the collection of Mrs. Lawrence. It should be potted in loose turfy peat; in winter it remains in a state of rest, and must then be kept in a moderately warm and rather dry stove, giving it little or no water.—*Bot. Mag.*, 4455.

Zieria macrophylla. *Large-leaved Zieria.* This is a much handsomer species than the old *Zieria lanceolata.* Mr. Allan Cunningham says it attains in its native country a height of from 14 to 16 feet, and the leaves and the flowers are the largest of the genus. It is a native of Van Diemen's Land, in shady ravines and mountain creeks, and is known in the colony by the name of Stink-wood.—*Bot. Mag.*, 4451.

CALENDAR OF OPERATIONS FOR AUGUST.

FRUIT AND VEGETABLE DEPARTMENT.

Glass.

Cherries, Peaches, Vines, and other fruit trees in pots or tubs, intended for forcing early in the season, should, if the wood be tolerably ripe, be placed in a cool, and partially shaded situation, to harden their wood and prepare them for early excitement, and any which require shifting should be attended to without delay, but be careful not to injure the balls.

Grapes ripening in houses should be supplied with abundance of light and air to secure colour and flavour, and also to ripen and harden the wood of the vines. It is advisable, too, to separate and shorten any long laterals which were left, that no unnecessary shadow may obstruct the rays of the sun; but too great exposure may injure by scalding. If the weather prove very dry and warm, it would be advisable to water the vine-borders with liquid manure.

Peach Trees often suffer from red spider; after the fruit are all gathered, and when the wood is ripening, syringe with clear lime and soot water, and also add a little sulphur.

Pines swelling up, and plants in vigorous growth, require watering with thin liquid manure.

Open Air.

Asparagus beds may receive a good coating of salt and be watered well with weak liquid manure, but wet weather must be selected for the purpose.

Cauliflowers for sheltering through the winter should be sown without any delay, and if they could be sown in a frame so much the better, but give them full exposure whilst the weather will allow of it.

Fruit trees trained to walls, &c., will be benefited by stopping and thinning out superfluous wood, and by encouraging the growth of the roots as much as possible.

Lettuces, Cabbages, and Winter Onions should now be sown. Hammersmith and Bath Coss lettuces are the best for this time.

Spinach should be sown some time betwixt the 7th and 15th of the month for winter use.

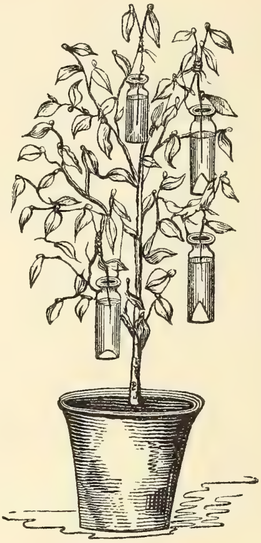
Turnips. The Stone, Dutch, and Six Weeks, should be sown in every spare bit of ground for winter use.

FLOWER DEPARTMENT.

Glass.

In the **Conservatory and Greenhouse,** Cinerarias, Primulas, and other winter flowering plants should receive every encouragement in perfecting their developments.

Camellias may now be grafted by inarching. Select well-grown shoots for the purpose. When the operation is completed expose the plants operated upon to a close and humid atmosphere. Using the small phial, for placing in the end of a detached cutting in water, is a very convenient method for gardeners.



Mignonette to flower in winter should be sown in 5-inch pots about the middle of the month.

Plants with tender roots, standing out of doors, should the weather prove wet, had better be taken into the Green-house about the end.

Orchid-house. Abundant atmospheric moisture, free admission of air, a liberal supply of water to those in a growing state, and partial shade are the requisites this month.

Open Air.

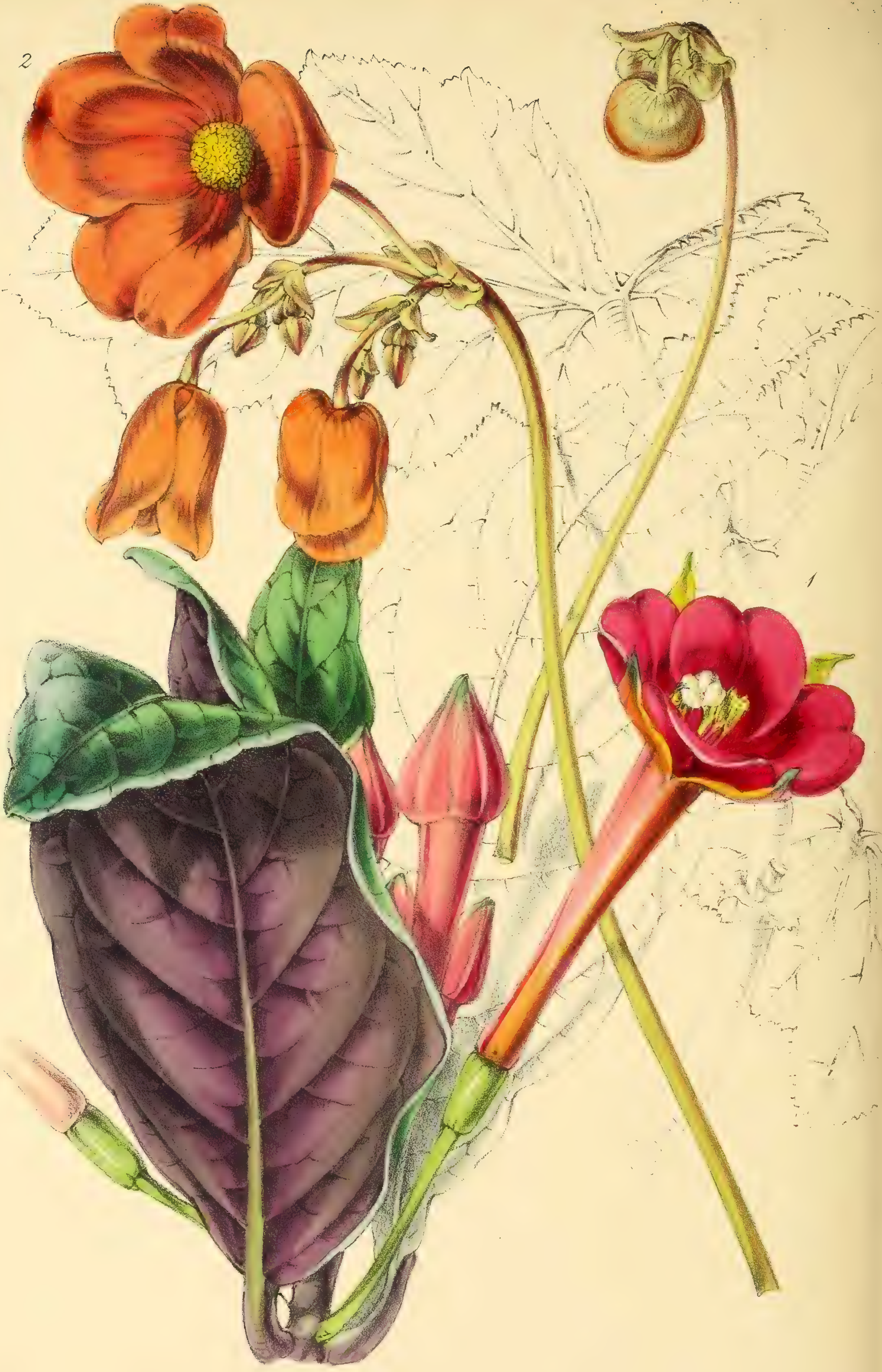
Rose-stocks, bud, and plant cuttings of all the evergreen kinds.

Carnations, layer still, and separate in damp weather such as are well rooted, pot them in 32-sized pots, and place them for a few days in a close frame.

NURSERY AND FOREST-TREE DEPARTMENT.

Cuttings of evergreen shrubs should now be put in.

Preparations may also be made for removing large specimen trees, about the end of the month: dig out the soil around the trees intended to be removed, at a sufficient distance from the bole to allow of a large ball of earth; by this means a number of rootlets will be formed, and any time in September or October, which are the best months in the year for the purpose, they may be taken up and carried to the situations they are intended to occupy.



S. Holden, del. & Lith.

1 *Fuchsia spectabilis*
2 *Begonia cinnabarina.*

PAXTON'S

MAGAZINE OF GARDENING AND BOTANY.

FUCHSIA SPECTABILIS. (Showy Fuchsia).

Class, Octandria.——*Order*, Monogynia.——*Nat. Order*, Onagraceæ.——(Onagrads, *Veg. Kingd.*)

Generic Character.—*Tube of calyx* adhering to the ovary at the base, and drawn out at the apex with a cylindrical four-cleft tube, whose lobes soon fall off. *Petals* four, alternating with the lobes of the calyx, and inserted in the upper part of the tube, very rarely wanting. *Stamens* eight. *Ovary* crowned by an urceolate gland. *Style* filiform, crowned by a capitate stigma. *Berry* oblong, or ovate-globose, four-valved, four-celled, many-seeded.—*Mag. Bot.* ix., t. 28.

Specific Character.—*Plant* an evergreen shrub. *Branches and stem* slightly angled, succulent, sanguineous, smooth, shining. *Leaves* in threes, ovate-elliptical, acute; *upper surface* dark-green; *lower surface* rich purple. *Petioles* an inch or more long, purple. *Peduncles* axillary, solitary, single-flowered, red, shorter than the leaves. *Ovary* with four furrows. *Calyx* somewhat funnel-shaped, four or five inches long, swollen at the base, scarlet; *limb* four-parted; *segments* spreading, acuminate, tipped with green. *Petals* large, deep-red, nearly orbicular, spreading. *Stamens* red. *Style* longer than the stamens. *Stigma* four-lobed.

Authorities and Synonymes.—Fuchsia spectabilis, *Sir W. Hooker* in *Bot. Mag.*, 4375.

A splendid new species of Fuchsia introduced by Messrs. Veitch and Son, Nurserymen, Exeter. It was discovered by Mr. Lobb growing in shady woods on the mountains of Peru, where it attains a height of 4 feet.

When in bloom, as its name indicates, it is a very gay species, its fine habit, profusion of flowers, and rich colours, which are displayed even by the stems, leaves, petioles, and peduncles, render it altogether a splendid object.

In cultivation it requires the same treatment as *F. serratifolia*, and *corymbiflora*, bearing some resemblance to these in habit. The soil should be light and rich, the drainage good, and the pots not too small.

It is propagated by cuttings of either young or half-ripened wood, planted in pots of sand, and placed in heat.

The generic name was given in honour of Leonard Fuchs, a celebrated German botanist.

CŒLOGYNE LOWII. (Mr. Low's Cœlogyne.)

Class, Gynandria.——*Order*, Monandria.——*Nat. Order*, Orchidaceæ.——(Orchids, *Veg. Kingd.*)

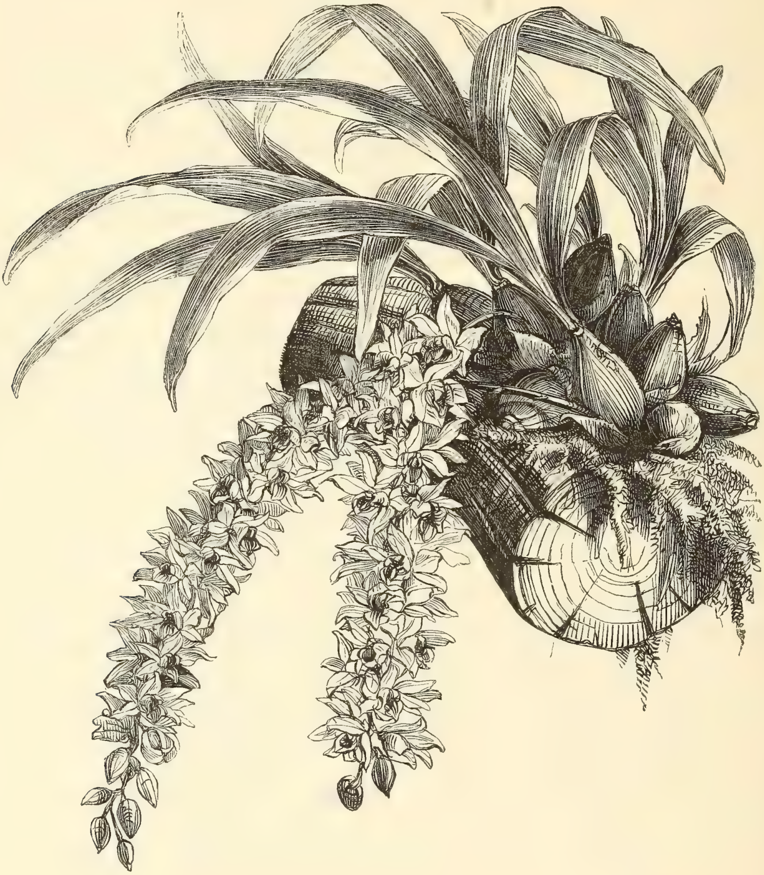
Generic Character.—*Sepals* connivent or spreading, free, equal, similar in colour to the petals. *Petals* occasionally resembling the sepals, but sometimes linear. *Labellum* cucullate, frequently three-lobed, with depressed streaks or crests on its surface, but sometimes quite entire, and without crests. *Column* erect, free, with a winged margin, expanding at the summit, or cucullate, with a two-lipped stigma. *Anthers* two-celled, covered, not divisible in the middle, inserted below the apex of the column. *Pollen-masses* four, free, inclining to one side; occasionally cohering.

Specific Character.—*Plant* an epiphyte. *Pseudo-bulbs* large. *Leaves* ample and graceful, 2 feet or more long. *Scape* 30 inches long. *Flowers* numerous, thickly set. *Sepals* and *column* of an uniform cream colour. *Labellum* indistinctly three-lobed, coloured like the sepals, but marked down the centre with a dash of bright orange.

Authorities and Synonymes.—Cœlogyne Lowii of the Nurseries.

This fine new species of Cœlogyne is a native of Sarāwak, in Borneo, where it was discovered by Mr. Hugh Low, Jun., who sent living plants of it along with many other valuable things to the nursery at Clapton, in October, 1845; from thence it found its way into private collections, and produced its fine flowers for the first time in the stove of S. Rucker, Esq., and —— Halford, Esq., in May, 1848, at which time our artist was kindly permitted to make the present drawing.

The wood-cut representation below exhibits the epiphytal character and growth of the large pseudo-bulbs and graceful foliage of this beautiful Orchid.

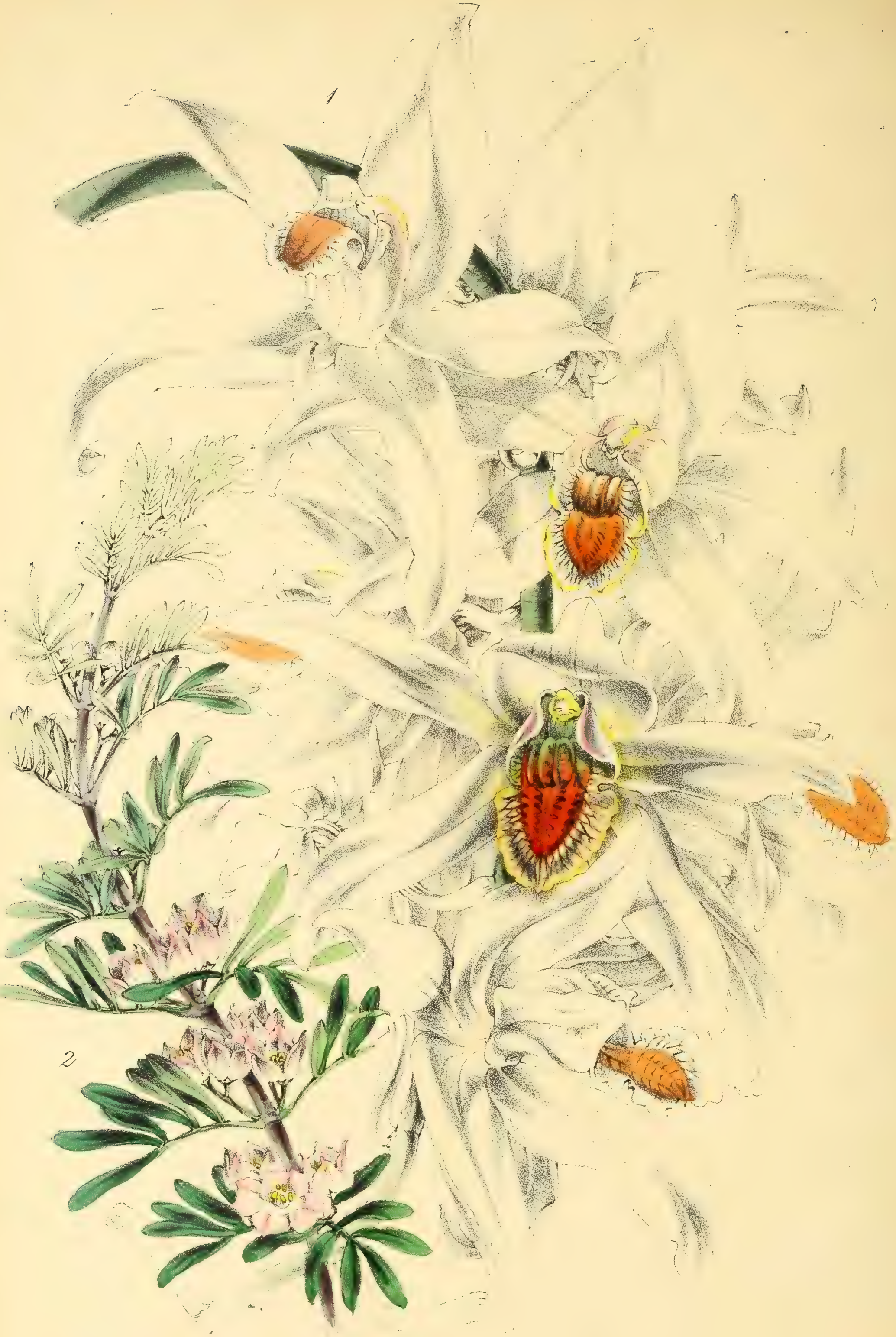


In its native country it is a magnificent plant. Messrs. Low had flower-spikes sent home upwards of 20 inches in length, and very fragrant. It grows in the low marshy grounds on the banks of the Sarāwak River, and is much prized by the natives.

It will thrive well in chopped moss and potsherds, and whilst in a growing state will require a liberal supply of water, shade, and a very humid atmosphere; but after the flowering and growth are over, the heat, water, humidity, and shade must be considerably diminished.

Propagation is easily effected by separating one of the pseudo-bulbs while in a torpid state, and treating it as the parent plant.

The generic name is derived from *koilos*, hollow, and *gyne*, female, which alludes to the structure of the stigma.



S Holden, del & Lith

1 *Cœlogyne Lowii*
2 *Boronia tetragonia.*

BORONIA TETRANDRA. (Four-stamened Boronia.)

Class, Octandria.——*Order*, Monogynia.——*Nat. Order*, Rutaceæ.——(Rueworts, *Veg. Kingd.*)

Generic Character.—*Calyx* four-parted or four-cleft, permanent. *Petals* four, marcescent. *Stamens* eight, the four opposite the petals shortest, all shorter than the petals; fine, fringed, or tuberculated, linear; usually dilated at the top, whence a very short thread arises, bearing the anther. *Anthers* heart-shaped, usually with a short appendage at the apex. *Styles* four, erect, smooth, approximate or joined together, terminated by an equal or capitate four-furrowed stigma. *Fruit* four two-valved carpels. *Seeds* ovate, compressed, usually one in each carpel.—*Mag. Bot.* ix. 123.

Specific Character.—*Plant* an evergreen shrub. *Branches* pilose. *Leaves* pinnated; *leaflets* four or five pairs, linear, obtuse, smooth. *Pedicels* short, one-flowered. *Flowers* purple-rose.

Authorities and Synonymes.—Boronia tetrandra, *Labill. Nov. Holl.* i., t. 125. Don's Syst. i., 792.

Boronia tetrandra forms a neat growing plant, with a compact habit; the foliage is not unlike that of *B. pinnata*, but is shorter; it was originally brought to this country in 1824, but is supposed to have been lost for some years, until its re-introduction a short time ago. Perhaps in flowering it scarcely equals some of the other members of the genus, but it is a very free bloomer, and from its compact habit of growth may prove an acquisition in our Metropolitan Exhibitions.

Our drawing was made in May from a specimen which flowered in the greenhouse of Mr. Henderson, Nurseryman, Wellington Road, St. John's Wood, London, and which was exhibited at the Horticultural Society's Garden in May last.

It is a native of New Holland, growing chiefly in Van Leuwin's Land.

In its cultivation particular attention should be paid to potting; the pot should always be of a proportionately small size; the drainage must be copious; a moderate supply of water only must be supplied, and that if possible should be soft or rain water; the soil should be composed of a light loamy earth, with a small portion of very sandy heath mould; and a light airy situation in the greenhouse should be afforded for its growth.

It is propagated by cuttings planted in sand, and placed in a very moderate heat.

Dr. Sibthorpe, a collector of plants, who had an Italian servant to accompany him in his tours, lost him by an accident at Athens, and commemorated his services in the present genus. His name was Francis Borone.

CLERODENDRON SCANDENS. (Climbing Clerodendron.)

Class, Didynamia.——*Order*, Angiospermia.——*Nat. Order*, Verbenaceæ.

Generic Character.—*Calyx* campanulate, five-parted, five-toothed. *Corolla* with a cylindrical tube, often elongated; *limb* five-parted; *lobes* equal. *Stamens* four, didynamous, exserted, secund. *Germen* four-celled, one-seeded. *Stigma* bifid, acute.

Specific Character.—*Plant* an evergreen climbing shrub. *Stems* and *branches* pubescent, indistinctly angular. *Leaves* ovate, entire, membranaceous, somewhat cordate at the base, and acuminate at the extremity, pubescent. *Petioles* slender and jointed. *Peduncles* axillary, many-flowered. *Panicle* leafy. *Calyx* coloured. *Corolla* white, tinged with rose-colour; *tube* much longer than the calyx, rose-coloured; *limb* spreading; *segments* obovate. *Stamens* and *style* exserted.

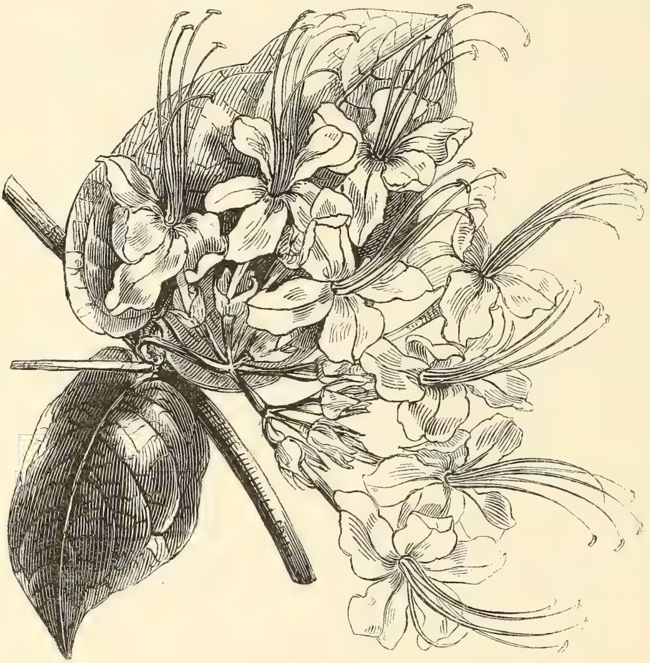
Authorities and Synonymes.—Clerodendron scandens, *Sir W. Hooker* in *Bot. Mag.*, 4354. Clerodendron umbellatum, *Poiret's Cycl.* v., p. 166. Clerodendron splendens album of the Nurseries.

This kind of Clerodendron has been commonly considered a variety of *C. splendens*, from which however it differs in so many particulars that we always were inclined to believe it a distinct species, and on closer examination and comparison with the description of *C. splendens*, our opinion appears to be well founded. Sir William Hooker's fine figure in the Botanical Magazine has confirmed all our previous conjectures.

The plant is little known in collections, although it has been grown in this country for several years. It is a native of Sierra Leone, where it was first met with by Mr. Whitfield, and through him was introduced by Messrs. Lucombe, Pince, and Co., Nurserymen, Exeter. It was also shortly afterwards obtained by Messrs. Henderson, Pine-Apple Place, London, with whom it flowered in October, 1842, when our drawing was made.

It has a neat climbing habit, is a remarkably free flowerer, and of easy cultivation in a warm stove, requiring only the common treatment of other stove plants. The flowers are not very showy, but the rosy tinge renders them pretty, and being produced during the winter months, when few flowers are to be had, they are rendered valuable.

An examination of the annexed engraving will more effectually explain the manner and peculiarities of inflorescence, &c., than a longer verbal description.



It is increased by cuttings of the half-ripened wood planted in pots of a mixture of sand and heath soil, and placed in a strong moist heat.

Linnæus founded the name of this genus on the variable medicinal properties with which different species are gifted. It is compounded of two Greek words—*Cleros*, noble, and *dendron*, a tree.

BEGONIA CINNABARINA. (Cinnabar-coloured Begonia.)

Class, Monœcia.——*Order*, Polyandria.——*Nat. Order*, Begoniaceæ.——(Begoniads, *Veg. Kingd.*)

Generic Character.—Male Flowers.—*Calyx* wanting. *Corolla* polypetalous; *petals* commonly four, unequal. Female Flowers.—*Calyx* wanting. *Corolla* with from four to nine petals, generally unequal. *Styles* three, bifid. *Capsule* triquetrous, winged, three-celled, many-seeded.

Specific Character.—*Plant* a perennial. *Leaves* large, palmated, serrated, oblique at the base. *Stipules* oblong, cuspidate, keeled. *Male Flowers* with four petals; two roundish and large, two oblong and small. *Female Flowers* with the petals nearly equal. *Racemes* produced from the axils of the leaves. *Peduncles* long. *Stamens* yellow.

Authorities and Synonymes.—Begonia, *Linn.* Begonia cinnabarina, *Sir W. Hooker.* Begonia aurantiaca, *Mag. Bot.*, vol xv., p. 215.

This new and very handsome species of Begonia is a native of Bolivia, in South America, whence it was lately introduced by Messrs. Henderson & Co., Pine Apple Place, London. The fine palmate foliage of a rich shining green, with reddish veins, and the large bright orange-red flowers, contribute to render the plant when in bloom a noble object, and one likely to become a great favourite with cultivators.

It is a greenhouse species, flowering profusely from July to the end of the season.

The ordinary management of perennial Begonias is sufficient to ensure a good bloom with this species.

Our drawing was made from a specimen which flowered in the stove of Messrs. Henderson's in October, 1848.

Propagation is effected by cuttings and seeds.

The name Begonia is given in honour of Michael Begon, a botanist of the seventeenth century.

CHEMISTRY OF HORTICULTURE.

By John Towers, Esq.

(Continued from Page 198.)

Atmospheric Phenomena claim notice as they are multiform and of deep interest. In the last article the two essential constituents of atmospheric air, which always combine in definite proportions, were treated of as constant elements; while two others, which are found in its volume, namely watery vapour and carbonic acid, are classed as variable elements. But there is a third which must not be passed over in silence, as it is always present, though to what extent, philosophy does not appear able to determine,—this is Ammonia, that combination of two of the gases, hydrogen and nitrogen, which was mentioned at page 166, and also at page 203 of the "Magazine of Gardening and Botany." Liebig was the first chemist who, in the first edition of his work on Agricultural Chemistry, attached importance to the ammonia that assuredly exists in the atmosphere; but modern theory, taken up by ardent young persons, went too far when it assumed that "plants obtain all their nitrogen from the ammonia which floats in the atmosphere." If, however, we recollect that there is not a decaying substance containing nitrogen, scattered over the earth's surface, that does not evolve some ammonia, it will be difficult to entertain a doubt of its actual presence in the atmospheric air; and in fact, direct experiments upon snow and the purest rain water have determined its existence therein. The smoke from coals contains also a volume of ammoniacal salts; and it would not be unsafe to conjecture that, by the energy of electricity, the nitrogen of the air, and the hydrogen of its watery vapour, are induced to combine in the exact proportions which form ammoniacal gas. Under whatever circumstances or proportions ammonia may actually exist, certain it is that every shower will convey some of it to the surface of the earth, and thus, through the wise economy of nature, give fertility to the numerous varieties of farm and garden plants, which demand the product of decay and putrefaction. How wonderful and admirable are those ceaseless changes which result from the grand law that nothing ever was, nor should be, lost!!

One additional remark upon the composition of the atmosphere may be hazarded; it is generally asserted that, "the essential gases oxygen and hydrogen exist in a state of merely mechanical mixture, and by no means, as some have supposed, in chemical combination." It would be difficult to set aside this rather modern hypothesis, especially since some of the most striking experiments tend to establish it. For instance, the formation of nitrous acid is induced by passing a succession of electric sparks through a small volume of pure atmospheric air contained in a glass tube: on the other hand, it appears unphilosophical to suppose that two gases so undeviatingly constant, so unvarying in proportion and quality,—be their situation throughout the world what it may—could exist in a state of mere mechanical mixture! Such a mixture implies an interfiltration only, an intersticial position of particles, under the law of Dalton, that "each and every gas becomes a vacuum to other gases;" whereas, that permanent and uniform blending of the two atmospheric gases, which has existed without alteration since the commencement of time, seems to require the presence of an agent which should convert the two constituents into one perfect and homogeneous medium, exactly suitable to the requirements of every being that inspires the breath of life. Air, it is true, can be rent and torn to pieces by powerful electric agencies, but then it is no longer air; its gases become separated, and in their act of separation produces other combinations. Connected with this subject, I find a passage in the Penny Cyclopædia, which merits insertion:—

"It has been found that two gases in a state of mixture exercise no influence one upon the other except communication of temperature, but that each is disposed in exactly the same manner as it would be if the other were not present. Thus it is found, entirely contrary to all previous notions, that no pressure of dry air upon water exerts the least influence in preventing the formation of steam, which goes on exactly as if the space above were a vacuum, and continues until further evaporation is stopped by the pressure of the steam already created. It is also found, that no degree of pressure of one gas can confine another in water; but that, supposing a bottle partly full of water, the gas confined in the water will escape to the surface and distribute itself in precisely the same way as if other gases were not present. By this it is not meant that the action, commonly called mechanical, cannot take place, or that a stream of hydrogen would not trouble the air; but only that the permanence of one gas is not affected in any way by the presence of another, so long as no chemical action is excited."

At this point, I think, we find some reason to conjecture that the theory of mechanical mixture may not be tenable, and for the precise reason that is advanced in its favour.

Mr. Dalton taking into consideration the presumptions which exist against the chemical union of the ingredients of the atmosphere, (*i. e.* of the oxygen and nitrogen,) infers that the atmosphere does not consist altogether of the compound called air, but that the nitrogen atmosphere is higher than the oxygen atmosphere.

"In fact, if there is no mechanical union, the above law of the mixture of the gases requires us to allow that each is an atmosphere independent of the other, and that the two are, most probably, of two unequal heights."

But what say facts? Did not Gay Lussac bring down air from a height of more than four miles, which was not found to differ from that of the earth's surface in the proportion of its oxygen to its nitrogen? Has any circumstance, or degree of any experimental analysis ever, in one instance, led to the inference that the two gases exist in any condition other than that admitted by all to be indisputably proved? Now, we maintain that the adventitious gases, not only those which have been already alluded to, but others which degrade and contaminate the air, producing ague and epidemics, *do* exist in a temporary state of mechanical union only, till they are either brought down by rain, or act upon each other electrically, producing true chemical results, but yet (providentially) without being able to disturb the perfect union of the two basal gases, in their mixed proportions of about 77½ nitrogen to 21 of oxygen.

Atmospheric vapour is the source of many beautiful and interesting phenomena. Nothing can be more so than the sudden absorption and disappearance of frosty rime. The readers, some at least, may probably follow us when we recal to mind that often, in winter, the trees, bushes, and herbage are completely encrusted with frosty spiculæ, so that each twig or stalk becomes enlarged to double its usual thickness.

A mist, or diffused stratus, in the early morning, the temperature being below the freezing point, is generally the cause of this deposition. The mist then disperses, ascends and forms clouds of varying modifications; gradually, however, (the frost still continuing,) the frosty rain vanishes, no drops of water fall, it is taken up and absorbed by the air, and in an hour or two, not a particle of hoar frost remains on herbage or plants. On one occasion, noted by me particularly, the rime coated all vegetation, the temperature at 8 o'clock being about 16°; there was no wind, no material difference in temperature, yet without any sensible cause, without thaw or solution, the whole of the rime vanished, every particle disappeared, it was all taken up a short period before noon, and passed into the atmosphere as invisible vapour, the transparency of the air was, however, lost and clouds formed. At from 2 to 3 o'clock the thermometer rose to 24°, by night-fall to 30°, on the following morning to 40°, and then rain commenced.

The formation of clouds depends mainly upon the electric condition of the vapours; and here it will be relevant to our subject to take a cursory glance of Mr. Luke Howard's classification.

The three primary forms are:

1. The *Cirrus* or curl, fibrous or streak-cloud, is the least dense of the whole series; it generally forms on a ground of a deep blue sky and threatens a change of weather.

2. The *Cumulus,* heaped or mass-cloud. It is a prevailing cloud in the day time of all seasons, and is exceedingly beautiful when it presents its silvery tops tinted with sober grey, against the bright blue sky. Round, well formed cumuli indicate settled weather. Pure cumuli are the accompaniments of fine weather, and they generally disappear about sun-setting.

3. The *Status*, haze or lay-cloud, is that extended haze or bed of vapour frequently seen in the valleys, permitting trees and tall objects to rise through it. If greatly and heavily extended, it constitutes fog. If it evaporate and vanish as the sun advances, particularly in and about harvest-time, the day will be fine; if, on the contrary, it lingers on the sides of hills, and forms heavy masses of clouds, rain will speedily follow.

The compound modifications are the *Cirro-stratus, Cirro-cumulus, Cumulo-stratus,* and *Cumulo-cirrostratus, Nimbus* or rain cloud.

1. *Cirro-stratus,* the mackerel-cloud, a blending of cirrus with stratus, consisting of dense, greyish, longitudinal streaks, advancing like a shoal of fish; it is often a prognostic of rain.

2. *Cirro-cumulus,* or woolly fleeces, high in the air; it forms a beautiful object, and is frequently a concomitant of fine weather.

3. *Cumulo-stratus.* It is a grand massive cloud of evening when, rising from the horizon, its towering masses are lit up by the sun. The prognostic is threatening, and the result is frequently a storm, preceded by coruscations of lightning.

4 *Cumulo-cirrostratus,* a blending of all the simple clouds; it generally produces rain or storm, followed by a total suffusion, wherein all modifications are lost, and the fall of rain becomes continuous till the mass breaks up and disperses.

ON THE CULTIVATION OF EARLY CAULIFLOWERS.

By G. T.

"Of all the flowers in the garden," Doctor Johnson is said to have observed, "I like the Cauliflower;" and it is scarcely necessary to add that the learned Doctor's preference for this somewhat delicate oleraceous vegetable has become an universal one; not the least conspicuous evidence of which consists in the hundreds of acres around the Metropolis, that are annually overspread with hand-glasses for the winter protection and spring advancement of Cauliflowers—the glasses employed glittering in the sunbeams like fields of crystal. In the gardens of the noble and affluent of the land, where every luxury that scientific horticulture and the gardener's skill can supply must be sought for and obtained, the production of Cauliflowers very early in the season, when the winter produce of its congener, the brocoli, has become exhausted, is always an especial desideratum. In the methods mostly adopted for the obtainment of Cauliflowers early, there is but little dissimilarity practised, the general rule being to sow for the earliest or handglass crop in August in a favourable situation in the open ground; and then, when the seedlings have developed a few "rough leaves," to transplant the most vigorous plants to a sunny, sheltered border, or beneath frames or handglasses, where they are to remain; and perhaps no better plan than this for the main summer supply can be adopted; but for the earliest Cauliflowers, experience has satified me that it is not a good plan to sow so early in the season; as by sowing in August, the plants attain a degree of luxuriance which, in case of an exceedingly mild winter, ultimately result in a rank plethoric habit highly injurious to them, when they come to experience the additional stimuli derived from cultivation under handglasses in the spring: whilst on the other hand, should the winter prove to be a very severe one, they not unfrequently derive an unlooked-for check in their luxuriant condition; and thus, on the return of a genial season, are the more liable to terminate their career by that very disappointing result, the premature development of inferior, if not almost worthless heads, better known to gardeners as the "buttoning" process.

In the cultivation of the Cauliflower, therefore, (like the Pine-apple after the formation of its fruit), there should be no check experienced, but rather a rapidly uniform progressive growth; inasmuch, as any sudden, undue cessation of the active principle, by whatever means occasioned, is certain to result in a greater or less degree injuriously.

It may at first sight seem somewhat paradoxical to assert that the earliest Cauliflowers are obtainable by sowing later than is usually done; notwithstanding, the best as well as the earliest I ever saw, were the produce of a sowing made the first week in October, which is at least a month or six weeks later than the autumnal sowing for main superior crops of this vegetable is generally made: but I must observe that the lateness of the semination was fully compensated for, by sowing on heat under the protection of glass, and by the after-treatment of the seedlings.

From observations then made, the following is the rationale of management, from the time of sowing to the crop being available for use.

In the last week of September, or in the middle of that month, if the season is not propitious, prepare an exhausted cucumber or melon bed under the protection of a two or three-light frame, by elevating the back of the frame to an acute angle, that when filled up with soil, the declining influence of the sun may be concentrated as much as possible on the bed. The surface of the hotbed, inside the frame, must be forked up rather deeply to arouse the latent caloric of the fermenting materials, which, if too cold, a quantum of well-prepared leaves and stable-manure must be added to restore the warmth of the old bed. Any coarse soil from the surface of worn-out cucumber or melon beds, provided it be tolerably dry, will do for the purpose of filling up the frame within three or four inches of the glass, and this should be surfaced with healthy loam passed through a coarse sieve, and commingled with particles of charcoal, wood-ashes, &c., to induce a healthy and rapid germination.

The frame must be quite filled up that the glass may all but rest upon the surface, which, for sowing in, should be neither wet nor dry, in the usual acceptation of the terms, but in a nice medium condition; as if too moist, the seedlings may perish at this dull season as soon as they germinate: or, if too dry, they will not grow so soon as desirable. A tolerably thick sowing must be made; the seeds barely covered with soil and wood-ashes, and the lights kept quite close, until germination is apparent; but should the seedlings be tardy in making their appearance, the lights must be drawn off on a fine day and the surface of the seed-bed moistened with *warm* water given from a finely perforated rose-watering pot.

The moment the young plants are apparent, the frame-lights must be elevated back and front, just half-an-inch or so at first, gradually increasing the elevation to the thickness of a brick on edge, both back and front, that a free circulation of the atmosphere may prevent "damping off," etiolation, and a tender debilitated growth; but despite these precautions, the young seedlings will sometimes "damp off" just on emerging from the soil; the atmosphere at this period, when the "light of the sun is hid for many days," being often charged with so large a proportion of water, that, to obviate its effects, the lights of the frame must be altogether drawn off on all favourable opportunities, the surface of the soil frequently stirred and loosened amongst the young plants carefully with a sharp pointed stick, and effectually dredged over now and then with dry wood-ashes and fine charcoal dust, to imbibe the surface-moisture, and ward off the ravages that slugs, &c., are prone to commit.

If the plants have gone on well, as they must have done, with the kindly attention and care bestowed upon them, they will soon become stocky, with short, blue-looking, sturdy stems and robust foliage; they must not now be allowed to suffer for the want of water, which should always at this time of the year be given to them in the morning in a tepid state, and in fine weather the lights may be altogether withdrawn in the day-time, and although replaced for the sake of ensuring safety from sharp night-frosts, the frame must then also be well aired, as mischief may be done in the way of etiolation, even in a single night; but as the seedlings have shortly to be transferred into pots, light rains will now do good, rather than inflict injury upon them; care must be taken, however, that the seed-bed does not become drenched or saturated with moisture; for, notwithstanding that the plants are now healthy and robust, overmuch wet will soon induce a "sickly hue" amongst the weaker ones, and denude the stoutest of them of their best leaves.

If it should be considered that much unnecessary "trouble" is thus entailed by sowing Cauliflowers on the first of October, or thereabouts, instead of committing the seed to the ground in the ordinary manner about the middle of August, we can only observe that we have been thus diffuse on the seminal management and rearing of the young plants, because all the "difficulty" that happens (and if difficult, it is only so by comparison,) is incurred in the treatment of the seed-bed; for, unless that be sharply looked after as adverted to above, in a dreary October or November, should such occur, we must be prepared to "bid good-bye" to our stock of hand-light Cauliflowers, an occurrence by no means unusual in a "bad season" under the methods ordinarily in practice.

On the other hand, once safe from the bed on which they have been reared, their cultivation is secure, and, as before observed, practical experience has convinced us of the superior advantages which ultimately occur from this, compared with the usual methods adopted for obtaining the earliest Cauliflowers.

On reference to my kitchen-garden diary, I find the following entry, "November 25th, 1847. Potting Cauliflowers sown on very slight bottom heat, on the 2nd October." From which it will be perceptible that in seven or eight weeks from the time of sowing, the young Cauliflowers will be fit for potting.

Any light, rich, free soil will suffice for the first potting, and small sixty-size pots are the best for use; the stoutest plants must be selected, and care taken to preserve all the roots in lifting them from the seed-bed; each must have a potsherd for drainage, and they must be potted tolerably firm, receiving a *warm* watering when potted, and be immediately plunged to the pot-rims in exhausted cucumber and melon pits or frames, of which there are, at this season of the year, generally plenty unoccupied.

A slight bottom heat may be generated, the plants plunged in light, dry soil, pretty near to the glass, &c., as directed for the preparation of the seed-bed, and kept rather close for a day or two until the roots strike into the new soil, when abundance of air must be given night and day, although, at such an uncertain season, the safest course to take is always to replace the lights and elevate them for the ingress of air at night.

Henceforth, the plants must experience no avoidable check; occasional waterings of well-diluted liquid-manure, in a tepid state, will invigorate their growth, and frequent dredgings of a mixture of soot, lime, wood-ashes, and char-dust, in about equal quantities, and in a finely pulverised state, will not only shield them from the destructive attacks of snails, &c., but will stimulate them as well.

Slugs are so cravingly fond of young Cauliflowers, that the utmost vigilance is oftentimes requisite to exterminate them, and should the dredgings they receive fail to preserve them, traps, in the shape of carrot and turnip or potato slices, must be employed to decoy them from their favourite pursuit of generally feasting on whatever is most valuable.

From the genial bottom-heat they are plunged in, and the other encouragements they receive, the plants will freely root, and in ten days, or at most a fortnight from the time of potting, be in readiness for a shift into pots as liberally large as can be spared, and pit or frame accommodation can be found for them to be re-plunged in. Forty-eight sized pots are the least that should be employed, or the plants will have become pot-bound ere the time arrives for planting them out beneath the hand-lights, and thereby receive a check at the precise period when it is indispensable for them to advance.

Bearing in mind the number of hand-glasses likely to be wanted, and that four plants for each glass will be required, no more than the usual number allowed for casualties, in addition to the quantity that will suffice, should be shifted, but the overplus may be permitted to take their chance in the pots they are already in; but they must not be otherwise neglected, as they are sure to fall in useful in early spring for stopping up gaps in the secondary ranks. In shifting, it is almost needless to observe that the more robust portion of the stock must be selected, the pots as large as can be afforded, the quantity of drainage increased, and the compost employed should be a rich and rather unctuous loam, well incorporated and enriched with thoroughly decomposed manure, commingled with soot and wood-ashes. The Cauliflower is a gross feeder, and flakes of not too rotten dung with a layer of soot, the latter to obviate the ingress of worms, it will be well to introduce immediately over the drainage.

The compost should not of course be sifted, but used in as rough and porous a condition as is convenient or deemed essential to the maintaining of porosity in the mass; they should be potted with tolerable firmness, the " balls " of course unbroken, and afterwards watered with *warm* water, to settle the soil about the roots.

Re-plunge them in a similar slight bottom-warmth to that which they were previously removed from, sufficiently near to the glass to prevent etiolation, when from severe frost or the unpropitious state of the weather the glasses are necessitated to continue on in the day-time, but, at the same time, room enough must now be allowed them for progressive vigour. Continue to accord them a free circulation of air, by full exposure when the weather will admit of the nocturnal as well as the diurnal atmosphere; renew the anti-slug allurements, freely water them with tepid liquid-manure, and increase the latter both in quantity and quality as the plants gain strength; dredge over now and then as recommended above, loosen the surface soil of the pots with a pointed stick, and never allow it to become encrusted; do not permit them to become dry at all, and although light rains upon them will make a wonderful improvement, they must not be allowed to become over saturated with moisture. Treated thus, the plants will be strong and the pots full of roots by the first week in February, when they may be planted out. No better situation in the open quarters can perhaps be allotted for the hand-glass culture they are now about to enter upon, than where the earliest crop of celery has been cleared, inasmuch as the heavy manuring preparation made for that luxuriant vegetable, in conjunction with the manure dispensed in the liquiform to the crop in a growing state, will have rendered the ground rich, and from the thorough pulverisation the ground has undergone by exposure to frost, &c. in taking up the celery crop, a quarter cleared of the latter would be, to employ the expression of a culturist, " in fine heart " for Cauliflowers.

To improve the " staple " of the ground, however, as the taking up of the celery crop proceeds, the ground should be " bastard-trenched," and the surface disposed " ridge and furrow " fashion (superficially speaking), and on dry frosty mornings, so as to thoroughly expose the under soil to the action of frost; and to pulverise the whole, it must be frequently well forked over, " tossed and tumbled " in an uneven manner, until the time of planting, when, to render the ground more fit for the reception of the plants, it should be top-dressed with a few barrowfuls of fresh soil, very rotten dung and wood-ashes, lightly forked in and levelled down with the potato fork.

Hand-glasses with *moveable* " caps " are decidedly better than those entire, being so much stronger as well as superior for aëration. All being ready for planting, dispose the glasses as is usually done, in as many parallel lines across the garden (or " quarter " of ditto), from north to south, as will answer the requirements of the case, in lines five or six feet asunder, and the glasses individually three or four feet apart (the distances, however, must respectively depend on whether it is intended to have intervening crops or not), and when they are placed, the interior of them may be prepared (for early Cauliflowers will not succeed well without preparation) by the introduction of a shovelful of dry soil mixed with wood-ashes, lime or char-dust from the soil store-shed; this must be forked in with a small hand-prong, and a plant inserted rather deeply in each angle, thus leaving the centre free.

If the weather is *not* frosty, sprinkle the plants with water in a tepid state, which will refresh as well as cleanse them of soil, &c.; they must be kept quite close for a week or longer if the air is brisk and piercing, and the temperature of the interior soil will thus be increased by the concentration of solar influence, and this, conjoined with the dry material, will act most beneficially, and materially assist in nullifying the effects of the very severe frosts we often experience in February and March.

In a week or ten days air must be admitted more or less, but modified according to the state of the weather, by placing the "caps" angularly on the frame, or if very mild and showery by the removal of them now and then, replacing them, however, at night; but by no means must aëration at this early period be too liberal, as the atmosphere will generally be found to penetrate the crevices of the best made hand-lights, *i. e.* those here spoken of with moveable caps and frames; besides, their condition is now strictly artificial, and the object is rather to "drive them along" while robust and strong; indeed, there should henceforward be no such thing thought about as growing them steadily, the period when that was requisite having passed away, and there is of course no bottom-heat to stimulate them over-much.

For the sake of neatness and convenience, alleys may be delineated alongside the hand-glass lines, and superficially covered with coal-ashes or sand, to render them easily approachable in wet weather.

As the Cauliflowers progress, frequently stir and loosen the surface, being careful, however, not to disturb the new roots they are making; repeat the dredgings over the foliage and soil, as often as needs be done to invigorate them, and as a preventive to snails and insects: give air with caution, draw the soil around the base of the glass outside, to keep out severe winds, and as they attain greater luxuriance, supply them well with *warm* manure-water about twice or thrice a week, and chiefly in showery "growing" weather, although in a dry and sunny time it must not be omitted, or rather not much less vigorously applied: perform these waterings in the morning until the middle of March; by that time, the days are considerably lengthened, and solar influence more intense; increase, therefore, the strength, quantity, and numerical application of the liquid as the days become longer and brighter, performing such operations early in the afternoon now, instead of in the morning, and close the glasses immediately afterwards.

A gross feeder is the Cauliflower at all times, and more especially is it so when the constitutional vigour is unimpaired, and the organs of absorption and perspiration in good "working order:" the brighter the sunshine, therefore, the more thirsty they necessarily become, and their thirst should be satiated, not only with the manure of sheep, or deer, or cows, in the liquiform state, but a good dose of *clarified* soot-water intermingled with weak brine procured from bacon-stores, or any other liquid containing dissolved saline particles, they will especially flourish with, once a-week, at least, not only as food, but also from the tendency the soot and salt have to destroy worms and grubs in the soil, and other insects.

From the growth now accomplished, the leaves will have reached, we presume, the top of the hand-lights; and in consequence, the frames must, without delay (or the foliage will be bruised and crushed), be elevated by introducing a brick or two bricks angularwise, at each corner of the frame on the existing surface previously made firm with the foot.

The open space beneath the frame, occasioned by the elevation of the latter, must be embanked with soil, turned up around the glasses, and the alleys may afterwards, for cleanliness and convenience sake, be re-levelled, and re-delineated. This embankment will leave them—to employ a maritime phrase—"high and dry;" but although high, they must not be allowed to become dry; renew the waterings therefore, but give air more freely, on all favourable occasions taking off the caps altogether. Perhaps the glasses may a second time require raising up, and if so, the operation will be but a repetition of the former process.

Towards the middle of April some nice heads will have made their appearance and be fit for table if wanted, as early Cauliflowers invariably are, in a hurry: but a week, or in short, a couple of days, will, in this stage of the proceedings, and the weather, make a surprising difference in their "coming in" for use; so that if no immediate necessity exists for cutting them so early, permit them by all means the consummation of their career, which will be, by the last week in April and first week of May, remarkably fine heads in succession. As soon as a head is perceptible, the good old custom of our ancestors of breaking the mid-rib of a leaf or two, and turning the latter inwards for *blanching* and protecting the young Cauliflowers, must be rigidly performed, or the inflorescence will expand with heat and turn yellow from alternate dews and sunshine; but should they come in too quickly in succession for immediate use (which, however, is seldom the case) they must be cut in time with a goodly length of stalk, and several full-grown leaves attached, and their stalks inserted in damp sand, or placed in pans renewed with fresh water daily, in a dark damp room or vegetable storehouse, which every establishment should possess.

Watering must be zealously followed up until the heads are about half-developed in size, when it must be exclusively withheld, the hand-glasses removed to the cucumber ridge, and the Cauliflowers themselves exposed to all the benefits that genial rains and increasing sunshine can confer upon them.

OBSERVATIONS ON A SINGULAR VARIETY OF PLANTAGO MAJOR, CALLED THE "BESOM PLANTAIN" OF RAY.

By R. Scott, Chatsworth.

In Vol. I. of the "Florigraphia Britannica," p. 193, are the following remarks:—

"The variety called by Ray the 'Besome Plantain or Plantain with spiky tufts,' has been noticed since the year 1632, when it was found by Dr. Johnson in the Isle of Thanet, and has since been observed in various parts of the country. The peculiarity of this form is owing to the bracteas becoming foliaceous, which beautifully shows that bracteæ are only diminutive forms of leaves."

Now, although in the above extract, the foliaceous form of the bracts is regarded as an instance of morphology, yet in some respects it differs from most forms which come under that character: every spike which the plant produces has its bracts foliaceous, and, as I have proved, this peculiarity may be reproduced from seed.

In the summer of 1845 my attention was directed to a plant of Plantago Major *var.*, from which I gathered seeds in the autumn. These seeds were sown in April 1846, four of the largest plants of that sowing were saved, and have invariably produced all the spikes with foliaceous bracts.

Again, in the Autumn of last year I gathered seeds from the plants raised in 1846. Those seeds were sown last April, and of the plants from that sowing (without reference to size) thirty-seven were saved. At present, August 9th, thirty-four of these plants have spikes, and all the spikes have foliaceous bracts. Nor can I perceive the least tendency to revert to the form which obtains in Plantago Major.

Here we have a peculiarity, produced originally by a favourable concurrence of climatic or other conditions, observed in a common plant more than 200 years ago, and since found in various parts of the country, becoming fixed, and that too in the absence of any care on the part of man.

These facts open a wide and interesting field for physiological and botanical inquiry.

Another species of this genus is occasionally met with, having one or more of the spikes with foliaceous bracts, I mean Plantago lanceolata. It would be desirable to ascertain whether in the case of this species, seeds gathered from such spikes would produce plants whose spikes would all bear foliaceous bracts.

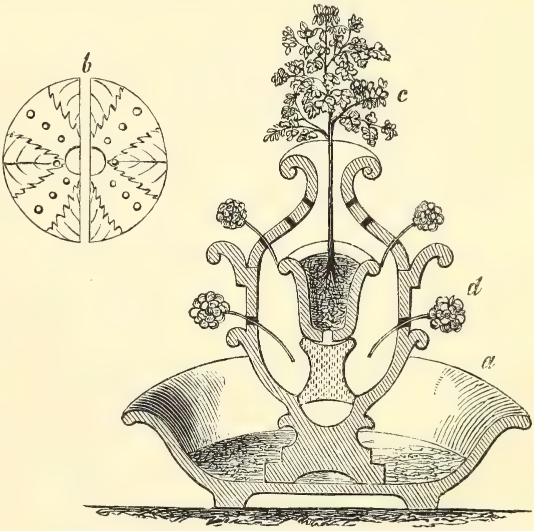
USE OF ORNAMENTAL VASES IN WHICH TO PLUNGE PLANTS FOR THE DECORATION OF GARDENS AND PLEASURE-GROUNDS.

By Mr. Saul, Garstang, Lancashire.

It has been computed by a competent authority, that no less a number than 1,000,000 of plants in pots are required annually for the supply of the London markets alone; and that fully two-thirds of these are purchased by amateurs, who possess no other convenience for their cultivation than a common house window. If this calculation be correct, and so large a quantity is demanded for a town like London, where all parties are almost constantly immersed in business, and where so few facilities exist for the growth of such hobbies, how immense must be the number requisite to meet the wants of the whole kingdom, where amateurs abound in every part, and where cultivation is carried on in the most extensive forms by thousands of persons, whose enthusiastic love of flowers leads them to purchase and cultivate almost every thing truly valuable and novel. I have often thought how desirable it would be, if some neat, simple and effectual plan could be hit upon to prevent the common red garden-pot from being seen, which by its plain uniformity and colour destroys much of the fine effect that plants would otherwise have in the situations where they are placed.

After mature deliberation, nothing appears to me equal for this purpose to different shaped vases, which are in every point calculated for this purpose, as they can be made to any size and pattern, and may be of sufficient proportions to hold one or several plants as the proprietor may think fit, and are especially suited for lawns and pleasure grounds where flower-beds could not be allowed, or would be altogether out of place.

Metal is the best material of which to make these vases, but they must have glass covers for tender plants, it being necessary that the earth in the pots should be exposed to light, otherwise the plants cannot flourish long; and especially for rooms, and other situations in-doors, this is important: glass is the best calculated for the purposes of both admitting light and supplying heat, but the glass should be either ground or coloured to prevent the pots from being visible. China or even earthenware could be made as ornamental as could be wished; and with glass covers to admit light to the surface of the pots they may be so constructed as to have a first-rate effect, and may be used either for plants or cut flowers, or both.

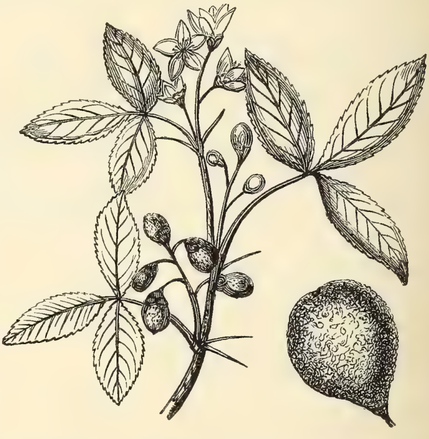


The lower part of the vases may be made to imitate leaves, and the top cover may have more than one aperture if desirable, for the stems of the plants to pass through; other apertures may be likewise made round the sides, so that cut flowers may be placed all round below the growing plants, as shown by the section (*a*); and when there is no growing plant, cut flowers may be also placed in the top through the aperture in the cover made for that purpose (*b*). Basons of water might be placed within the vase and their heights regulated by moveable blocks of wood, which may by this means be made to suit either small or large flower pots, or glasses, or basons, or anything else required. The cover of the vase (*b*) should be made in two pieces, to afford facilities for placing in or taking out the plants or removing the water in the basons. One large bason at the bottom for cut flowers with long stalks will answer every purpose.

CULTURE OF THE BENGAL QUINCE, OR MAREEDOO OF INDIA.

The common Bengal Quince is the *Ægle Marmelos* of Roxb. Corom. and our Botanical Catalogues, and the *Cratæva Marmelos* of Linnæus' Spec. 637. The fruit is also called in its native country, *Mareedoo* and *Marmelos*, but it is better known to Europeans by the name of Bengal Quince, from its great resemblance both in perfume, colour, and size to our European Quince, and Elephant-apple, from the fruit being fed upon by elephants. It is a native of the mountainous parts of Coromandel and other places in the East Indies, and is associated with the Orange tribe (*Aurantiaceæ*) in Dr. Lindley's "Vegetable Kingdom." The generic name Αιγλη, *Ægle*, is from one of the Hesperides.

In its native country it forms a broad-spreading bush, 10 or 12 feet in height. *Branches* armed with simple and occasionally double spines. *Petioles* 2 inches or more long. *Leaves* trifoliate; *leaflets* obovate, somewhat obtuse, denticulate, middle one largest, stalked, lateral ones smaller, sessile. *Flowers* produced in the axils, and at the termination of the branches in racemes containing eight or ten blossoms each. *Calyx* three to five-lobed. *Petals* five, spreading. *Stamens* thirty, unconnected, with long, linear, mucronate anthers. *Stigma* almost sessile. *Fruit* baccate, almost like an orange, turbinately globose, many-celled; pulp nutritious and also slightly aperient, it contains a large quantity of tenacious transparent gluten, which when fresh may be drawn out into fine threads two or three yards in length. It grows to a larger size than the common Elephant-apple or Yellanga (*Feronia Elephantum*), and is very delicious to the taste and exquisitely fragrant. *Cells* numerous, many seeded. *Seeds* imbedded in the fleshy mucous pulp. The fruit is used chiefly in the dessert and for preserving; the Dutch also in Ceylon prepare a perfume from the rind.



The plant was introduced to this country in 1759, and was at one time pretty extensively cultivated; but the introduction of so many new and brilliant subjects during the last thirty years has so far eclipsed it, that if we except a few old and curious collections it is now scarcely ever to be met with, notwithstanding it deserves every cultivator's care.

In cultivation it requires a light loamy soil, mixed with one-fourth of very rotten dung, if grown in a tub; but if planted out in the borders of a stove, good turfy loam without any admixture is the best.

The temperature for its growth and fruiting should be a moderate stove heat, and if the roots can have access to a little bottom warmth, so much the better; in these respects it associates with the Rose Apple (*Jambosa vulgaris*), the Cherimoyer (*Anona Cherimolia*), the Mombin or Yellow Hog-plum (*Spondias lutea*), and the Chinese Lee-Chee (*Euphoria Litchi*), all which require a medium temperature, free circulation of air, a liberal supply of water, and a moderately humid atmosphere. Good drainage is also essential wherever the plants are grown.

Increase is effected by ripened cuttings, which root readily in sand under a hand-glass in heat.

TREATMENT OF PLANTS INTENDED FOR WINTER AND SPRING FORCING FOR THEIR FLOWERS.

By G. T.

When the summer and autumnal beauty of the flower-garden is departed, the gardener commences an anxious supervision of the reserve-garden; or, to employ a commercial phrase, "he begins to take stock" of what he has in store likely to be serviceable in producing an in-door floral display, throughout the approaching winter; and he may consider himself an enviable man, if he is quite satisfied with the result of his inspection.

Too often the very reverse of this is the fact; nor is there anything very surprising in the circumstance, if amid the unceasing activity of business, and the various demands continually made on his attention in summer, the stock of forcing-plants should have become somewhat overlooked until late in the season.

It is a truthful proverb which declares that "to reap in summer we must sow in winter;" and this is equally applicable to plants intended for forcing as well as other things, for unless an efficient stock of robust, well-cultivated plants be provided early in the summer season, it is in vain we look for flowers—leaves and shoots will rather be the produce, when artificially excited in the winter season.

The purport of the following observations, therefore, is to invite more timely attention to the matter, as I have known the following treatment advantageously and with the best success attend the preparation of plants intended for forcing for their flowers, or fragrance.

As a general rule, to which, however, there are exceptions, plants intended for forcing may be separated into two classes—those requiring to be established in pots at least a year, as roses, Persian Lilacs, and other hardy shrubs, Rhododendrons, Pæonies, or what not; and those that have been pot-grown five or six months previous to forcing, as Pelargoniums, Salvias, Heliotropiums, and other half-hardy plants.

Amongst the exceptions to these, may be enumerated the Lily of the Valley, and a variety of hardy, fibrous-rooted, herbaceous plants, as Phloxes, &c., which, if taken up with good balls containing their roots undisturbed, will succeed, if forced immediately; although a better and more certain production of bloom might reasonably be relied on, if established in pots two or three months previously to the operation of forcing.

On the practical appreciation and observance of two or three essential principles, all the ultimate success in the artificial excitation of plants depends; for, unless they are early induced to establish themselves, complete a vigorous and healthy growth, and are, therefore, early thrown into a state of comparative rest; and, moreover, unless when introduced into the forcing-house the excitement is conducted slowly and gradually at first, a due balance being carefully maintained between the artificial application of heat, and the natural amount of light obtainable in our dreary winters, the certain result will be a very imperfect premature development of inflorescence; for notwithstanding the ease with which plants may now-a-days be supplied with heat artificially, it is apparently impossible for science to produce a substitute for light; and solar light is equally as essential to mature and healthy growth, as heat is advantageous in inducing any elongation or development of the plant itself.

With reference to the first-mentioned class of plants intended for forcing—hardy deciduous shrubs and evergreens, as Persian Lilacs, and Roses, Rhododendrons, Kalmias, &c., some attention should be paid in selecting them to procure such as are dwarf, robust, short-jointed, and yet the most vigorous young plants, that can be obtained from the nurseries. The most sunny and exposed part of the reserve-garden should be selected for them; and the soil, if not naturally the best, should be improved by incorporating with it a good body of turfy mellow loam and peat, and if the latter is not naturally sandy, a considerable portion of rough sand must be artificially added, so as when roughly dug over to afford an extensive rooting medium, and in a deep rich soil nothing will induce the production of abundance of fine fibrous rootlets, sooner than the plentiful presence of sand.

The middle of October is a good time for transplantation to the reserve department, where the plants should be inserted in nursery lines alternate with each other, and plenty of space should intervene between them in the rows and lines, so as to encourage their development into compact bushy specimens. When the planting is finished, if any pruning or removal of stray branches will improve their appearance by rendering them more symmetrical, this should immediately be performed.

When the selection is made from the nursery, a few of the most vigorous looking plants that possess a greater tendency than others to grow upwards, should be selected; and for the sake of having a variety formed into standards of different heights. This will be easily accomplished with such genera as Rhododendron, Kalmia, Azalea, Prunus, Cerasus, Ribes, Seringa; and such leguminous genera as Genista, Cytisus, and Adenocarpus, especially make nice standards by grafting on some vigorous member of the family to which they belong, and which I have seen exemplified in a very interesting manner in the Arboretum at Bicton. The genera just enumerated are well adapted for forcing; and although the neatest standards are formed by grafting, very good ones may be obtained by choosing vigorous young plants, and ultimately concentrating all the vigour into one stem, by subsequently removing all other branches, and heading back the one retained when 3 or 4 feet high, and attention paid to the removal of stem-laterals as often as they make their appearance *after the formation of the head*, which will generally be accomplished in two seasons after the first heading-back of the chosen stem.

When the planting is finished, the ground should be superficially forked over, to render all straight and even, and afterwards receive a good mulching of exhausted tan or short litter of any kind to ward off the effects of severe frost; a similar mulching being continued the succeeding spring and summer also, if a very dry one, when copious waterings should be given occasionally to obviate the effects of drought.

Whatever pruning is requisite should be altogether accomplished in summer during the growth of the young wood, which must be repeatedly regulated by disbudding and stopping; or in the case of standards by training erect the stems, removing their side-shoots, stopping when high enough, and supporting for a season or two with stakes. Any tendency to flower must as repeatedly be checked by removal of the germs of inflorescence so soon as they are perceptible, as this operation, in conjunction with the timely disbudding of superfluous growth, and the stopping of the more rampant shoots, will greatly invigorate the remaining wood, which, in consequence of being thereby exposed to the greater influence of sun and air, will attain an earlier and more perfect maturity before the approach of winter. This is always a desideratum in cultivation; but in the case of plants intended for forcing, the maturity of the wood either naturally, or by artificial means, is an indispensable step to success.

The plantation will now have completed one year's cultivation under circumstances consonant with its well-doing and the object in view; and doubtless the best plants will be in fit condition for potting, &c., to be forced the year ensuing: but, pre-supposing the major part to have been young plants, when selected, they will certainly be greatly benefited and in better forcing condition if encouraged in their present position for another year, in the same manner as adopted the first season; namely—by timely attention to disbudding, stopping of every sign of inflorescence, and mulching, watering, &c., in very dry weather.

An additional operation or two, however, must this season be performed; each plant should have its strongest horizontal roots severed, by making a concentric incision at a judicious distance from the main "ball" of roots, with a sharp spade inserted perpendicularly to its full depth, several times during the season, previous to the taking up the plants in the autumn for forcing. This operation will of course induce a greater number of fibrous rootlets to protrude, and consequently the energies of the plants will scarcely receive a check by lifting. Where such plants as Rhododendron, Kalmia, &c., have attained a large size—too large probably to be potted conveniently, it is a good plan to allow them to remain where they are, until wanted at once for forcing; and abundance of fibrous roots may easily be obtained by opening a suitable trench around, and laying bare the surface of the roots of each plant, then filling up the trench and covering the exposed roots with rich flakes of leaf-mould or rotten dung, and plenty of fine sand or sandy peat, in which they will freely make new rootlets. This operation is likewise applicable to large bushes that may have been long-established, and which it may be desirable on a emergency, to take up for forcing; it must, of course, be performed several months previous to forcing, otherwise there will not be time enough for the roots to find their way into the new compost.

Another operation of the greatest importance to be observed, is the protection of the plants from an excess of natural moisture towards the completion of their annual growth, whether in pots or in the open ground. This is not easy of accomplishment where plant-forcing is carried on, extensively, especially as the plants should receive every atmospheric influence apart from actual wet.

The principal difficulty, however, resides in the extent to which this is required; and surely in these days of "rough plate glass," "oiled calico," "composition bunting," and more recently "patent frame lights at 7*d.* or 8*d.* the superficial foot," something might be done for the protection of a lot of plants intended for forcing from an excess of moisture. Greater expense is sometimes bestowed upon a less deserving purpose; but however this may be, protection of some kind is indispensable to success; for if plants are exposed to all the rain which falls from Heaven in a "wet English season," their annual growth will not ripen sufficiently to flower except, very imperfectly, when artificially excited.

Perhaps the most economical protection that could be devised, would be a tent-like erection on the ridge-and-furrow principle, similar to that erected last spring over the exhibition of American plants in the Botanic Garden, Regent's Park, where the protecting material is supported on a skeleton frame of strong posts inserted into the ground, with stout wires stretching from ridge to furrow to retain the supporting frame-work in position. The sides and ends should of course be left fully exposed to a free circulation of the atmosphere at all times; and in fine, or only partially wet weather, the covering should be altogether removed, or rolled up whilst the frame might remain to be used again in case of need.

I have been thus diffuse upon this subject, because it is an all-important one, and a circumstance that too much escapes observation in the treatment of both fruit-trees and flowering shrubs that must undergo artificial excitement, at a period, too, when every natural influence is but fitfully present in a very modified form.

Pots as deep, and otherwise as roomy as can be spared for the purpose, must be selected for potting the stock early in October in a rough compost of good loam, leaf-mould, and sandy peat, the drainage being secured by crushed bones or lumps of charcoal and green turf. In lifting the plants from the ground, three individuals should be employed, two for the opposite insertion of their spades, and one for taking care of the plant being lifted; the balls composed of a mass of root-fibres, must be reduced as much as it is consonant with discretion and common sense; and when potted with tolerable firmness, and as deeply as circumstances will admit, must be plunged under the north wall of the reserve-ground, in saw-dust, coal-ashes, old tan, or sand; and unless the weather is inclined to be dry and windy, no water should be given, although a brisk shower or two will refresh and make them clean. Here they may remain plunged; the same attention to watering and general management being accorded them as when in the open quarters of the reserve garden; and, if needs be, protected from *excess* of moisture also, as before hinted throughout the winter and following summer, until wanted for forcing in succession, before which the plants should be lifted from the plunging medium, the pots well cleansed, and placed upon the surface of the bed for a week or two, so that the effects of removal may not be felt when introduced into the forcing-house or warm conservatory. Plants thus treated, will continue in capital forcing condition for many years, provided care be taken not to expose them too suddenly to the vicissitudes of early spring winds immediately after being forced; they must rather be gradually inured to the open air again.

A little fresh compost may easily be introduced about them *immediately after* *flowering*, by reducing the balls somewhat, and repotting and treating them in all respects in conformity with the directions given above. After being successively forced four or five times, it will be necessary to gradually discard any debilitated ones, and replant the others for a couple of years or so, in a good soil and situation in the open ground, where they must receive a severe old-wood pruning if requisite, to reduce them within bounds, and encourage a new growth, before being potted again precisely under the conditions first adopted, with the addition of watering them well occasionally with weak liquid manure, to reinvigorate them for forcing again, which they will generally be better suited for than newly provided plants. As the old ones deteriorate, however, a new stock should gradually be preparing for supplying the deficiencies; for, by the preparation of a few fresh plants annually of what may be most required, a vigorous, healthy supply is thus always kept on hand.

The generality of half-hardy plants suitable for the purpose should be propagated as early in spring as cuttings are obtainable—say in February; and when well-rooted, potted in suitable pots and compost, and grown in a pit or frame until the last week in May, when they will be fit for planting out in a good stiff, though not over rich compost, on the north or west border of the reserve-garden. In planting, they should be allowed 2 or 3 feet asunder, to enable them to grow into large, robust, and compact plants, which they will do by the end of July, if the following treatment of them is adopted:—From the time they become established in pots, check every effort to grow in a straggling manner by closely pinching back every shoot when 2 or 3 inches long; rigidly observe the same practice when planted out, and growing vigorously (by the aid of liquid manure if the season is a dry one). Not a bloom must be permitted to expand upon them, nor a shoot to go "unstopped" when 4 or 5 inches in length; for if the resources of the plants are permitted to be expended beyond the production of sturdy shoots and foliage now, a poor return of flowers will be the certain result at the time they are anticipated and most in request.

(To be Continued.)

ON THE CASSIA OF THE ANCIENTS.

THE genus Cassia of our Botanical Catalogues, is very extensive, containing from two to three hundred species. The greater part are handsome flowering stove and greenhouse plants. Some are useful in domestic economy, and others, as the *C. lanceolata*, *Ligustroides* and *Obovata*, are used for medicinal purposes under the name of Senna. The generic appellation was given to it by Linnæus, and is, according to Olaus Celsius, derived from the Hebrew, Ketzioth, rendered *κασιαν* by the translators of the Septuagint, and Latinized, Cassia; but it is very likely, the Cassia of Dioscorides, and other ancient writers, was a different plant from any member of this genus.

Whenever Cassia is mentioned by the ancients, it is always noticed in connection with spices and perfumery, and in many parts of the Sacred Writings the same connection is maintained. In Psalm xlv., 8. its fragrance is alluded to, "All thy garments smell of Myrrh, Aloes and Cassia," &c., and from Exodus xxx., 24. we learn, that it was one of the aromatic substances used in the preparation of the sacred oil employed in the Jewish sanctuary of worship. This connection with Myrrh (*Balsamodendron Myrrha*); Aloes, (*Aloexylon Agallochum*); Cinnamon, (*Cinnamomum verum*), and other similar substances, led the Greek translators to render it in some places "Iris", the powdered root of which is a well-known perfume, called Iris or Orris-powder in our shops, possessing the fragrance of violets. In the Hebrew it is called "Kidda."

The most probable conjecture respecting this valuable article is, that it is the produce of several species of Cinnamon; as Cinnamomum Cassia (*C. Aromatica*, *Nees*), C. Zeylanicum, *Nees*, C. Culilaban, and others which supply the Cassia bark of our shops in the present day.

The Chinese Cassia or Bastard Cinnamon (*C. Cassia,*) is a native of the hottest parts of Asia, as Ceylon, China, Cochin China, Malabar, Sumatra, and the Eastern Islands; it has also been introduced to the continent of India, the islands of the West Indies, Brazil, the Mauritius, and other parts of South America.

In its native habitats it forms a spreading shrub or tree, forty or fifty feet high. *Trunk* erect, short. *Timber* white and somewhat porous. *Bark* smooth, ash-coloured. *Branches* diffuse, spreading, forming a fine head. *Leaves* shining, bright green on the upper surface, glaucous beneath, with white veins, wavy at the edges. *Flowers* in terminal and axillary panicles, inconspicuous, inodorous, or perhaps slightly fetid. *Fruit* the size of a small gooseberry, insipid, soft, of a dark blue, nut inclosed, the kernel of which germinates soon after if falls. The *root* of the tree is thick, and contains a considerable proportion of camphor, which, in case of its being wounded, exudes in abundance.

The bark of several other plants is known by the name of Cassia; amongst these may be mentioned the Culilawan (*C. Culilaban,*) which possesses a fine flavour of cloves; that of *C. nitida*, which can scarcely be distinguished from the true Cassia; that of Santa Fé, which is the produce of *Nectandra Cinnamomoides;* that called the Clove Cassia of Brazil, which is the bark of *Dicyphellium caryophyllatum;* and the Cassia of the Isle of France, which is the bark of *Oreodaphne cupularis.* But the kind from which we derive our chief supplies is Cinnamomum Cassia.

The Cassia of our shops is of three kinds, that from China, called Chinese Wild Cinnamon; that from the islands bordering on China, and that from the Continent of India; the bark bears a great resemblance to that of the true Cinnamon, but the taste is different, and the quills are usually in single rolls. The trees are stripped in the same manner as those of the Cinnamon, but the bark is of less value from its containing more mucilage, and less aroma. Cassia buds, as they are called, are not obtained from this tree, but are the hexangular fleshy receptacles of the seed of *C. verum* or true Cinnamon. An oil is also procured from both the leaves and roots, the first is called the "Oil of Cloves," and "Oil of Cassia," &c., and the latter the "Oil of Camphor;" both are powerfully stimulant, and of great use in medicine.

The inner bark is the Cassia of commerce. The barking commences in May, and ends in October; branches of three years old are selected and topped off with a bill-hook or knife. To remove the bark, a longitudinal incision is made through it on both sides of the shoot, so that it can be gradually loosened, and taken off entire, forming hollow cylinders. The bark in this state is tied up in bundles, and allowed to remain for twenty-four hours, by which a fermentation is produced that facilitates the separation of the epidermis or outer bark, which, with the green pulpy matter under it, is carefully scraped off. The bark soon dies, contracts, and assumes the quill-like form, after which the small pieces are put within the larger.

The trees that grow in the valleys in white sandy soil, are ready for barking when four or five years old, but those in deep rich soils and shady places require to be seven or eight years of age before they are fit for the purpose, and although the plants grow in such situations far more luxuriant, yet the bark of such trees is inferior, being thick, spongy, and possessing little of the fine aroma for which it is valued. When the trees become more than eighteen or twenty years of age, the bark is considered little worth. The soil in which the best trees are formed, is composed of three-fourths of nearly pure sand, and in situations where the temperature is high, regular, and replete with moisture. The best soils in Ceylon are brown sandy loams, composed chiefly of decayed gneiss or granite rocks, abounding in felspar.

The plant is not difficult of cultivation, but the following particulars must be noticed:—

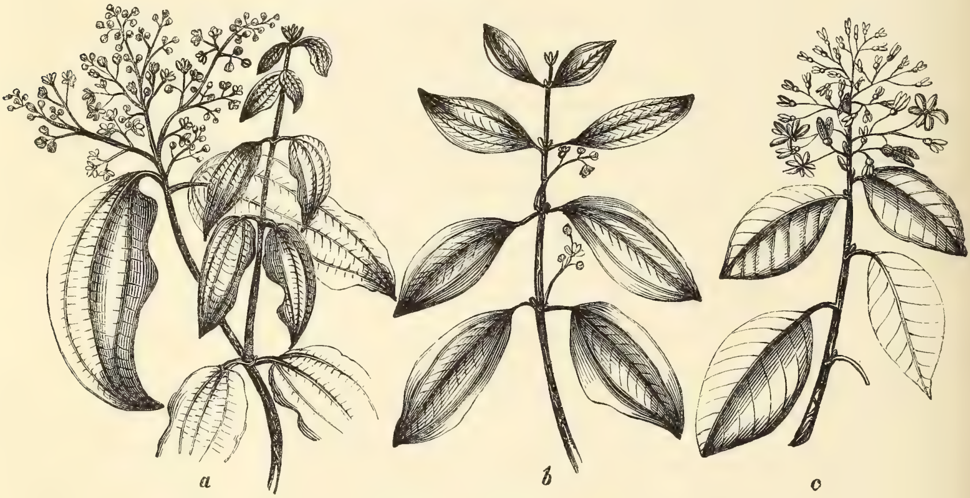
If the plants are grown in pots, the best soil is an equal mixture of sandy loam and peat, and let the potting be repeated as often as requisite, so as never to allow of the roots becoming matted together; if this should ever be the case, merely loosen them with the hand so as to assist them to start again in the new soil.

Always give a good drainage; lay a large piece of broken potsherd over the hole at the bottom of the pot and about an inch thickness of broken crocks, over which lay a few fragments of rough turf to prevent the soil from washing in and stopping the course of the water. Water freely at the roots, and syringe frequently when the plants are in a free state of growth, but moderately during the period of rest.

Although the plants do not flourish so well without some degree of bottom-heat to the roots, yet the pots must never be plunged in a fermenting material which would communicate too much moisture to the roots and destroy the tender fleshy fibres; the best way is to grow them in proportionately large pots and place them on a flue or other medium for supplying heat, where the temperature will not be sufficiently hot to render the soil very dry.

The atmosphere of the house should be tolerably humid, and the thermometer should never be allowed to sink below 65° Fahr. even in winter.

Propagation is effected by cuttings; as soon as the young wood is thoroughly ripe, take off the cuttings about six or eight joints long, trim off the lower leaves from the part to be placed in the soil; and when thus prepared plant them in a pot of sand, and place the pot in a moist bottom-heat and cover with a glass.



DESCRIPTION OF THE WOODCUT.

a, Chinese Cassia, or Bastard Cinnamon (*Cinnamomum Cassia*), or Cassia Tree of the Ancients.
b, Camphor Laurel (*Cinnamomum Camphora*). The Camphor Tree of the Ancients.
c, *Dryobalanops Camphora*, or Sumatra Camphor Tree.

ON THE CAMPHIRE, OR CAMPHOR TREES OF THE ANCIENTS.

The singular volatile drug, sold in our shops under the name of Camphor or Camphire, and imported in such large quantities from China and the East Indies, is a production too well known to require any minute description here; but the species of plant from which the ancients procured it, and which is so often mentioned in their writings as a plant of great value, is far from being well understood.

From the ancient descriptions of this tree, it appears to have possessed a pleasant fragrance, and to have been suited for mixing with, or even forming nosegays, much in the same manner as we now use sprigs of myrtle. In the Sacred Writings, where it is several times mentioned, the very same idea is conveyed; and it seems to have been cultivated as a very choice plant, in the pleasure-grounds of persons of eminence amongst the Jews, in similar localities with Spikenard (*Nardostachys Jatamansi*), Calamus (*Andro-*

pogon Calamus-aromaticus), Cinnamon (*Cinnamomum verum*), Myrrh (*Balsamodendron Myrrha*), Frankincense (*Ceradia furcata* or *Boswellia serrata*), Aloes (*Aloexylon Agallochum*), and other kinds of chief spices and perfumes. See "Canticles" v. 13, where the tree is said to grow in an orchard of spices and perfumes, which was watered by a number of fountains; the Hebrew word פרדס (*Pardes*) translated *Orchard*, which we understand as a place wholly dedicated to the growth of fruit-trees, signifies, more properly, a Paradise or Pleasure-Garden, which for the kind of plants mentioned above, would seem to be a more appropriate meaning for the word.

In "Canticles" v. 14, however, it is said to grow in the vineyards of Engedi, where there was probably not only a garden of choice fruits, but likewise a Botanical or Pleasure Garden, where the Israelitish monarchs could retire, and cultivate their botanical taste. We have here also an intimation of one of its uses; a cluster or bunch appears to have been placed in the bosom, after the manner of our nosegays, from which we should conclude that the branches themselves emitted a pleasant perfume.

The Chinese Camphor-Laurel (*Cinnamomum Camphora*) partakes of these required properties: it is a very handsome shrub, with beautiful shining green foliage, emitting a very pleasant and exhilarating perfume, and producing Camphor in abundance, even in a concrete form, especially in the roots. On account of the plant being so highly impregnated with Camphor, the bark, although similar in many respects to the Cinnamon, is yet unfit for use in spicery. The greatest quantity of imported camphor is produced in the Island of Formosa, and brought to Canton in large quantities by the Chinchew junks for exportation. It is obtained by distillation of the wood, branches, and leaves.

The plant is a native of China, Japan, and some parts even of South America: in the two former places it is said to grow in great abundance in the woods. The *tree* is evergreen, and rises to fifty feet in height, becoming divided into many *branches*. The *leaves* are ovate-lanceolate, entire, smooth, shining, of a pale yellowish green on the upper surface, glaucous beneath. *Petioles* an inch long. *Peduncles* axillary, two inches or more in length; many-flowered. *Flowers* small, white, and inconspicuous.

The introduction of this plant to Great Britain was about the year 1727, and is said to have been cultivated by Miller; for many years, however, it has been a scarce plant, although it requires little more heat than what is afforded by a common greenhouse, and may be easily increased by cuttings planted in pots of sand, and placed in heat.

Camphor is also obtained from another tree of an entirely different order of plants, —the *Guttifers;* this tree is called *Dryobalanops Camphora*, and produces the hard Camphor of Borneo and Sumatra, of which countries the plant is a native. This Camphor is said to be more pure, and much less volatile, than the common Camphor obtained from the Camphor-Laurel. It is found in a concrete state in cavities and fissures in the heart of the tree, in large pieces a foot or eighteen inches in length: and persons, called Toongoo Nyr-Cappoor, select such trees as are supposed to contain the largest quantity. The Bornean Camphor Oil is also obtained from the same plant, and is supposed to be the Camphor in a partially formed or fluid state.

The tree is stated to grow wild in the forests of Borneo and Sumatra, where it forms one of the tallest and largest of trees. The *bark* is brown. The *leaves* from three to seven inches long, upper ones alternate, lower opposite. *Flowers* brown, divided into five long segments.

The age of the trees at which the Camphor is obtained, is not correctly known. The young trees, however, yield only oil: the method of extracting it, is to make an incision with an axe fourteen or sixteen feet high up the bole, and the oil gushes out, and is received in Bamboos, or any other utensils.

It is identical with *Dryobalanops aromatica* of Gært., and the *Shorea Camphorifera* of Roxb., and is a stove-plant not difficult of cultivation. It is readily increased by ripened cuttings planted in sand, and covered with a glass in heat.

REMARKS ON THE RHODODENDRON.

By T. T., Chatsworth.

England, of late years, has undoubtedly made surprising advances in the various branches of Horticulture.

Although, for horticultural pursuits, the climatic conditions are not always what could be desired; yet, by dint of skill and perseverance, backed by large resources, the climatic defects are in some measure counteracted.

And, while in our hothouses, considerable attention has been bestowed on the culture of the various forms of tropical vegetation; a great number of hardy ornamental trees and shrubs have been introduced into our gardens, where they flourish as luxuriantly as in their native habitats. To this class belongs the Rhododendron.

Probably no genus of evergreen shrubs contributes more than the hardy species and varieties of this family to beautify the pleasure-ground; they usually form a prominent feature in the shrubbery, and their natural habit renders them admirably suitable for the rockery, or other situations where irregularity of surface prevails. Nor can the eye of taste be offended with the Rhododendron on the lawn, in groups or single specimens. In almost every variety of situation, and at any season, this shrub is an agreeable object; its verdant foliage forms a pleasing contrast to surrounding nature in winter, and attaches an air of cheerfulness and an interest to situations which otherwise would be destitute of either.

But while the merits of the Rhododendron as an evergreen is acknowledged, it rises in estimation by uniting the qualities of a gay, early, and abundant bloomer; to these (together with the little attention requisite to successful culture) much of its popularity is owing. Indeed, to such an extent has the cultivation and hybridising of the Rhododendron been practised, that the genus occupies a considerable part of the "American-ground" in the provincial and other nurseries; and forms the chief attraction of the metropolitan "American exhibitions."

Far be it from me to depreciate hybridising in this genus; and without a wish to supplant any one variety now cultivated, I would submit what, no doubt, has occurred to admirers of this family, who may have had an opportunity of viewing when in flower the the later-flowering varieties grown in private gardens or otherwise, that, however striking at first sight such may have appeared, on the eye passing a second time over their floral beauty a sameness could be perceived; and a third or fourth survey confirmed the impression, that whatever difference in point of floral tints there might be between varieties, yet for effect as a whole, additional variety was wanted; and this would appear the more obvious from the circumstance that while the cultivated species in this genus produce "flowers of all hue," comparatively little of that variety is observed amongst the late-flowering hybrids which at present form the greater part of ordinary collections. Yet from the facility with which crosses may be obtained between any of the species, and from the fact that any difference as to time in the blooming of species (which it may be desirable to cross), cannot be regarded as an obstacle, as pollen, if carefully preserved, will retain its virtue for years; it is probable that persevering and well-directed efforts might soon accomplish much.

But in addition to what has been stated, a still greater variety of colour might be introduced by crossing the Azalea and Rhododendron. On this subject the late Hon. and Rev. W. Herbert observes,—"I have never raised beyond the third or fourth leaf a cross between *Rhododendron Ponticum* and an Orange Azalea, though I have saved two or three through the first winter. My soils, however, are very uncongenial to them, and under more favourable circumstances they would have been saved."

A few such crosses grow in a reserve-garden, not ten minutes' walk from where I now write; they are in every respect healthy, and have been planted in the border for three years, without protection in winter.

HARVESTING OF SOILS AND COMPOSTS AND THE PREPARATION OF CHARRED MATERIALS OF GENERAL UTILITY IN CULTIVATION.

By Mr. G. T.

THIS is one of those apparently trivial but really important subjects in gardening, to which sufficient value is far from being generally attached, although a little reflection will render it obvious that such items are deserving of a greater amount of attention from gardeners than they usually receive. What, for example, is more conducive to success in plant cultivation, or indeed in any branch of culture whatsoever, where it is necessary for the soils and composts employed to undergo some degree of artificial preparation before being used, than to have at command at all times and at all seasons—on rainy as well as on sunshiny days,—an appropriate stock of soils in healthy condition for immediate use. This it must be admitted is the very "primum mobile," so to speak, of success in cultivation, and although the benefits derived by plants from the soil in which they grow, originate as much or perhaps more, from its mechanical action and arrangement, as from any inherent chemical properties which it may possess, yet it must not be forgotten that a sweet, moderately dry, mechanically healthy condition of soils is as much secured, enhanced and preserved, by timely harvesting and protection, as are the chemical constituents which they may partake of.

If more indubitable evidence of the especial value that ought universally to attach to what may expressively and emphatically be designated a healthy condition of composts, is desired, we need but just take a peep into the potting sheds and compost departments of the great "specimen" plant cultivators of the day, and here may be seen "fibrous peat," "turfy loam," "leaf-mould and silver sand," and the numerous et cæteras, unnecessary here to particularise, preserved as items of indispensable importance in the aggregate, and as fit for use in January as in June; but if we extend our observations in another direction, how frequently shall we find the compost stores exposed alike to every vicissitude of the seasons and the elements, unfit for use perhaps at the time most needed, overgrown with a luxuriant vegetation, appropriating the greater part of what is elementary and valuable; thereby subjecting the rare exotic which these soils are destined to nourish and support, to a deprivation of its rightful, and it may be its most essential food, which has been usurped beforehand by the indigenous nettle and its compeers.

If this be true of ornamental plants in pots, the same principle will apply with equal, if not with greater force, to soils and composts necessary for all the purposes of artificial cultivation from the winter frame-grown radish and carrots, to the cucumber, the melon, the pine-apple or pot-grown grape vine. Early melons and cucumbers, it is well known, are especially fastidious respecting a healthy condition of soil to root in; indeed half the failures of the earliest crops of this fruit (the melon) might be easily traced to the uncongenial, uncomfortable condition of the soil in which they are made to exert a lingering unkindly growth, and the same might be said of other things as well as melons, but enough has for the present been adduced to invite more attention to a subject of such first-rate importance in cultivation.

No establishment, not even one of moderate extent, should be without a "compost department," by which I intend a plot of ground proportioned to the requirements of the case, situate conveniently in rear of the plant or forcing departments, (or in any other situation rendered more suitable by local or particular circumstances,) surrounded by a close evergreen hedge 5 or 6 feet high, for the purpose of concealment, with one or more entrances wide enough for the admission of carts loaded with soil, &c., and if the situation is somewhat elevated and (being free from the vicinage of trees) fully exposed to atmospheric influence, so much the better.

If sheds and out-buildings already exist to a sufficient extent in the establishment, for the necessary accommodation of composts and potting materials to which particular value is attached, the erection of any in the compost ground may of course be dispensed with, but if such are not at command, there can be no better arrangement made, or at least more consonant with the general convenience of the establishment, and especially if the cultivation of plants is extensively carried on, and the houses are close at hand but without sheds attached, than to erect the potting-shed and open-shed for storing, intermixing and preparation of composts, &c., in the compost department; and if this plan is adopted, advantage should be taken of the opportunity to arrange all other matters, incidentally or immediately connected with the potting-shed, in as systematic a manner as possible, namely, by constructing separate bins for containing the different kinds of soil, drainage, &c., as turfy loam, finer ditto; the same for peat soils, silver and coarse sand, sphagnum, chopped moss and decomposed vegetable matter, as leaf-mould, rotten manure, &c., sods of fresh turf, potsherds of different sizes, charcoal dust and lumps of ditto, also broken bones and bricks and dust of ditto, small pebbles for commingling with heath compost, and various other useful and indispensable adjuncts to cultivation, which would thus be conveniently at hand, for employing with comfort and facility to the operator at all seasons of the year.

Having in the foregoing remarks briefly and incidentally introduced matters of minor value in detail, but of major consequence in the aggregate, I will now proceed to the more important consideration of the "Harvesting of soils," for which purpose there is no better period than the present and following months (August and September). I must first observe that the best cultivators of the present day do not attach that importance to the employment of such a variety of soils which horticulturists of half a century ago deemed so essential, nay, indispensable to success; on the contrary, so long as a good base, so to speak, is provided in the cultural methods now in vogue, we are sure, by the clear light which modern science has shed upon our proceedings, to compensate, by artificial auxiliaries and ameliorations, for any comparative sterility or deficiency in the soils we now make use of. The compost ground, therefore, should be mainly stored with substantial loams and peats, but as the vicinage of every garden is not a common, where there is generally a choice of material to be made, the best that the neighbourhood affords must of necessity satisfy our requirements.

As a general rule, however, sound turfy loam and peat of different kinds are procurable in abundance from neighbouring commons, but if they are not, it is obvious they must be obtained from somewhere.

Dry weather, and a dry upland situation should be selected for the operation of securing the soil, when the top turfy layer only, with all the inferior vegetation adhering, should be cut with a turf mattock in junks 18 inches or 2 feet square, and 5 or 6 inches in thickness; and as the operation of cutting proceeds, it should be turned upside down, with the soil side exposed to solar and atmospheric influence for a few days, until sufficiently dry, and the roots of grasses, heather, &c., are killed by the exposure, when if an immediate opportunity does not present for conveying it at once to the compost department, the sods should be collected into several conically-formed stacks to secure it from rain until carted home, which, however, should not be longer delayed than can be avoided, especially at an uncertain period of the year. A platform of rubble, logs of timber, or coarse brush-wood should be formed in the compost ground, for stacking the turves and peats upon when carted home. The stacks may be circular or quadrangular—say a parallelogram 6 or 8 feet broad by 20 or 30 feet in length, erected to a perpendicular height of 8 or 10 feet, finished off with a ridged or pitched roof, forming an angle sufficiently acute to readily throw off the rain; or if built up circularly of any convenient diameter and elevation similar to a haystack in a farmer's homestead, the apex of the stack must be formed so as to ensure the dryness of the soil; but in whatever manner the turves are stacked, the platform they are erected upon should be elevated 5 or 6 inches above the surrounding ground level, and as the stacking of them proceeds, layers of rough brushwood (not thorny wood) must be introduced frequently throughout the erection to prevent fermentation or the generation of fungi, and to ensure the entire healthiness of the mass until required for use.

When finished, the stacks must be thatched with reeds or straw, or which perhaps is a better plan, effectually protected from wet by a moveable wooden roof, constructed of any convenient lengths for removal, and tar-painted for the preservation of the wood, which if taken care of, when not required for immediate use, by annually renewing the coat of tar or thick paint, it will last for many years.

Soils thus harvested with all the inferior vegetation, as grass and other native herbage, heather, furze-tufts, &c., will be mellow from the decomposition of the vegetation collected with it, and in capital working order, for breaking up for Pines, Melons, French-beans, Cucumbers, &c., the following spring; although as regards its suitableness for the latter, I have observed that French-beans, and Cucumbers too, succeed best in it, after it has been stacked up in ricks fourteen or fifteen months previous to being used, as it has then become more decomposed, and consequently in a mellower state for the tender roots of these annuals to protrude in. Pines and Melons, on the contrary, succeed best in it when almost fresh cut. These kinds of soils, thus procured and harvested, will afford the main supply for general purposes.

A sufficiency of other materials, however, should be procured at an eligible season, and stored up in the compost department, and alike protected from rain, to meet any emergency, and supply the requirements of particular purposes.

These will consist of different kinds of sand, rich vegetable matter or leaf soil, loam rendered friable and mellow by the presence of sand, stiff or clayey loam, decomposed cow-manure, rotten hotbed dung, road scrapings, and what may appropriately be termed alluvial or deposition soils, procured from river banks, the bottoms of fish ponds or pools when cleansed, scrapings of ditches, &c.; the latter being rich in decomposed vegetable matters are exceedingly valuable for many purposes, and for none more so than for the cultivation of Persian Melons, Vines, and Peaches in pots, &c., whilst the utility of all are apparent in every establishment, although not so generally met with in a wholesome and fit condition for immediate use.

As a general rule, the collecting of these soils and composts should be accomplished in the summer time, when in a tolerably dry state, and stored up in the compost ground in long parallel ridges, the sides of which must be sharply sloped off to throw off rain when thatched or protected with boards. In winter, when a dry frost occurs, advantage must be taken to remove the coverings from all the soil and compost ridges (excepting the stacks of dry turfy loam, which may of course remain undisturbed until wanted for use,) which should be repeatedly turned and forked backwards and forwards, to expose them to the action of frosts, which will sweeten and pulverise, as well as destroy worms and grubs, the larvæ of insects, &c.

All should again be well protected whilst in a healthy dry state, and if, as will sometimes occur when required for use, the soils should be found in a drier state than is desirable; this may be easily remedied by intermixing a portion of humid soil with the compost about to be employed.

It will be at once perceived, that the advantages accruing from a systematic method of harvesting soils, and having at command a congenial rooting medium, for the almost innumerable purposes of artificial cultivation must be immense, and *vice versâ*. And that such is a foremost principle to cultural success, there can be no more intelligible or convincing data than practical experience. The "preparation and application of charred materials of general utility in cultivation" may appropriately be connected with the foregoing subject, and, notwithstanding the observations I have to make, are altogether of a practical tendency, I trust they will not be deemed the less valuable on that account. I may observe primarily, that I mean to refer to the utility of all kinds of garden sweepings and such refuse as the prunings of shrubs and fruit trees, the remains of kitchen-garden crops, &c., when reduced by the process of burning, or rather by a species of charring very nearly to the condition of wood ashes rather than to the obtaining of charcoal proper in the more solid form.

The value of the former in the cultivation of the kitchen-garden cannot be half so well appreciated as it deserves to be, or we should see it more generally employed; whereas the latter, *i. e. charcoal in the solid or lumpy form*, is in a great many instances worse than an encumbrance to cultivation and good management.

Char-ashes, obtained by reducing the refuse above referred to, in conjunction with a good proportion of strong clay and green turves, is not only a capital fertiliser, but one of the best extirpators of insects, oftentimes so annoying to the gardener and destructive to his crops, whether in embryo or in the more advanced stages of growth.

During summer, when all suitable materials are, superficially at least, in a dry state, is of course the best time for the preparation of charred materials, to accomplish which, the usual attention bestowed on heaps of burning rubbish only is required; care being taken, however, to prevent reconsumption when once reduced, by forming the materials into several piles and well smouldering the burning mass, occasionally with clay or stiff loam. When quite extinguished and become cold from exposure, the charred materials should be placed in bins or old barrels protected from atmospheric influence and the rain; thus ridding the rubbish yard of its contents, and providing one of the most useful adjuncts to good cultivation.

Of the more immediate practical application, and effects of this useful material in cultivation, a few observations in addition to what has already been said, may not be considered out of place.

Intermixed with equal portions of lime, coarse sand, soot, and pure wood ashes, it is excellent both from its carbonaceous and mechanical properties for drilling in, or sowing broad cast, with every description of crop, and this use of it is worthy of the especial attention of agriculturists as well as gardeners.

The effect its employment has on the healthy germination of seeds, and the preservation and fertilisation of the embryo plants—protecting them alike from an excess of cold and moisture, and shielding them from the attacks of injurious insects in the ground—is really astonishing, and only to be appreciated by ocular demonstration of experiments, tried in juxtaposition with crops to which the invigorating material had not been applied.

I believe from experience, that plants thus germinated amid elements especially congenial to their embryo welfare, imbibe a constitutional vigour which (other circumstances being equal) they do not generally possess until the attainment of maturity; and no small amount of additional health and vigour is imparted by after applications, disseminated broadcast over the foliage and the soil in humid weather, or before the evaporation of the dew, which, to say the least, goes far to the extermination of insect depredators.

ON PROTECTING THE BLOSSOMS OF FRUIT TREES ON OPEN WALLS.

By Henry Bailey, Nuneham Park.

The extraordinary fluctuations of temperature to which we are liable in our insular position, and which appears of late years to prevail to a greater extent than formerly, frequently disappointing the hopes of proprietors who have gone to much expense to secure fruit; and of gardeners who have anxiously and watchfully brought their trees into a fruit-bearing state; have been but too sadly manifested during the month of April which has just past: March (which succeeded to comparatively mild winter months) was bland and beautiful, and the young growth of the Peaches was fresh and luxuriant, when alas! after a period of untimely excitement the rigours of winter revisited us in their worst form. On the 18th of that month, we had here the thermometer 10° below the freezing point. Although protected, the young wood of the Royal George Noblesse and Grosse Mignionne Peaches was completely killed, and the fruit both of Peaches and Apricots frozen through, while I fear, from the quantity of sap in the vessels of the Trees, serious injury must have been done to their whole system. Latterly, the fine growing weather which has prevailed, has caused the trees to push forth their new shoots, but it is to be feared that the organisation of them is too much deranged to allow the processes of vegetation to go on as in other seasons. It is also to be feared that the late growth will not be ripened sufficiently for next year's bearing, in our usually sunless seasons; Apricots, Pears, and Plums, are but (too generally) failures from the same cause; and hence it becomes an interesting and important consideration, how far, and by what means, such calamities may be prevented, or their dire results mitigated. To discuss or to assign reasons for what may be the causes of these fluctuations of the seasons, which have marked the progress of the last few years, is not the province of the gardener, or of this Miscellany; if it is indeed within the powers of the most profound astrologists and meteorological observers. It is sufficient to know that our comparatively mild winters are often followed by very severe frosts in March and April, when vegetation is young and tender. It matters not with what care a tree may have been trained, or what its promise of blossom may be, induced by the skill of a good gardener; if at this crisis there are not the ready means of guarding against ordinary and extraordinary frosts, ruin must ensue to our fairest hopes of fruit.

Many and various have been the modes of protection adopted by gardeners, and equally various their results: much depending upon the peculiar circumstances of the locality as to elevation, exposure, dryness of soil, &c. Some have even advocated no protection at all, from observing the injury which frequently results from the use of too close a material in mild sunny weather. We are, however, advocates for protection; we would provide for extreme cases of heat or frost, by having the most perfect control as to the removal, or use of our covering.

The flued wall seems to offer the only effectual means of repelling frosts, when the degree of cold is so intense as it has been in the past season, even in our Midland and Southern counties, for at Exeter in the past season the frosts were most severe. We would not advocate its use to bring the trees forward, but only on occasions when the rigour of the weather was such as to penetrate through the nettings, canvas, straw ropes, or other materials, and most willingly accord the expression of our favourable opinion as to the value of such a structure for accelerating the ripening of both the wood and the fruit, in cold, wet, and sunless Autumns.

Since glass has become so much cheaper, it is of course very desirable to extend its application for the production of fruits, we should therefore earnestly advocate its more extensive use, as a certain means of obtaining this desirable result, but it must be remembered that glass alone is not sufficient to repel 10° or 12° of frost, and that it may (if fixed without adequate means of ventilation) render the enclosed air so hot as to be injurious to the tender blossoms and embryo fruit. We would recommend the multiplication of the small Dutch moveable houses, with a common flue or flued wall, or, what is better, although more expensive at first, a hollow wall with hot water-pipes, by which means the heat is more equally diffused, and the scorching effect of the fire (where it enters the flue) obviated.

The attention of gentlemen who are about to form fine gardens should we think be especial directed to small portable glass cases, and the means of heating their walls on occasions of these severe visitations.

If the walls of our gardens were so built that moderate heat could be applied in cases of emergency, and its radiation prevented by the use of thick canvas, made to slide off or on according to circumstances, and, in addition to this, there was a temporary coping of board used; we venture to opine that the disappointment of proprietors who have gone to much expense with their walls would be less frequent, and the excessive mortification of persevering gardeners of rarer occurrence.

In almost all seasons (however severe) we find that the Apricot trees on the walls of cottages, escape injury much more frequently than those trees which are growing on common open walls. Much is we think in such cases due to the protection afforded by the projecting thatch, and much also to the accumulated heat retained, and slowly radiated by the walls of a dwelling-house, this in fact yielding the same advantage as a hot wall. How often too do we see the industrious cottager, who has only one tree, putting on and removing his covering according to circumstances, and eventually securing a crop of fruit, while in the fine garden of the great proprietor all is failure.

Surely it would be wise to bear in mind in protecting our wall trees these practices and circumstances, seeing that they are so generally successful, and that they are too perfectly agreeable with those data on which alone sound horticultural practice is founded.

It may not be irrelevant to glance at the various ordinary modes of protection which are in use in different places, but which cannot be deemed sufficient in frosts of the intensity of that which has called forth these observations. However simple they may be, if they are not perfectly efficacious, much labour is misapplied, and we think it would be wiser to make a small amount of certain provision rather than to have a larger extent liable to casualty.

In cases of slight frost, the simple appliances we are about to enumerate answer very well, but severe frosts render them of little avail. What we then really want is a sufficient power of warding off intense cold, to be used in a perfectly *ad libitum* manner.

The materials generally used for expediency are: Beech boughs with the dried leaves adhering to them, Spruce-fir boughs, Yew boughs, the spray of branches, such as is used for pea-sticks, canvas, bunting, old fish-nets, woollen netting, &c.

Beech boughs are only procurable in some peculiar districts, as in the chalk formation in Buckinghamshire, where they are very generally used for this purpose, for which their uniform dryness and lightness render them very eligible.

The boughs of Spruce-fir trees and those of the common Yew afford good protection, and possess this advantage, that, after being on some time, the leaves fall off, preventing the too sudden exposure of the embryo fruit which is frequently injurious. Of fish-netting, woollen netting, bunting and similar materials, we can only say that they are protectors in slight frosts, but not in intense ones; we believe, that when placed permanently against a wall, they frequently occasion much mischief in the hot days (of which we have usually some) in the month of March, by preventing the circulation of air essential for the proper setting of the fruit, and obstructing the required amenity of that indispensable agent in all vegetative process, solar light.

We cannot refrain from again drawing attention to the small portable upright Dutch forcing house, or rather glass case which we have seen so generally and advantageously used in Holland, for both late and early forcing. The Apricot is there treated thus, and is cultivated to a greater extent than the Peach; and surely there is no fruit which is more deserving of a little extra care and expense, and none so ill calculated for the open wall, either in the country or the moist climate of Holland.

In all which relates to the protection of tender plants it must be borne in mind that it is not the lowest degree of temperature which they are capable of enduring in their native countries, after their growth has been matured and indurated by powerful suns, that must be taken as a criterion of their hardihood in the climate of Great Britain with its undetermined fluctuations; it is not the positive intensity of the cold in this country that thwarts the energies and blasts the hopes of gardeners and their employers; but it is the unexpected excitement of to-day in a period of comparative rest, and the paralysis of to-morrow, that must be ever guarded against if we wish to succeed, and to do this effectually we must not only make provision for the probable but also for the possible, and to that end it is hoped these remarks may in some degree be instrumental.

There is perhaps no other country in which the qualities of skill, observation, reflection and unceasing energy are so inseparable from the profession of a gardener as in this; and it is perhaps mainly owing to the difficulties of our climate which are from time to time acting as stimuli to our exertions, and calling into action those talents, which were it more auspicious might have remained latent, that we may attribute the superiority of our great exhibitions, to anything else of the kind which can be found in the civilised world.

In conclusion then, we would again advise those who possess extensive walled gardens, and desire to have certain crops of fruit, to multiply their small and economical glass structures, and those who are forming gardens to build their walls so that heat can be applied when occasion requires, and we think we have demonstrated the necessity of these precautions by well-authenticated facts.

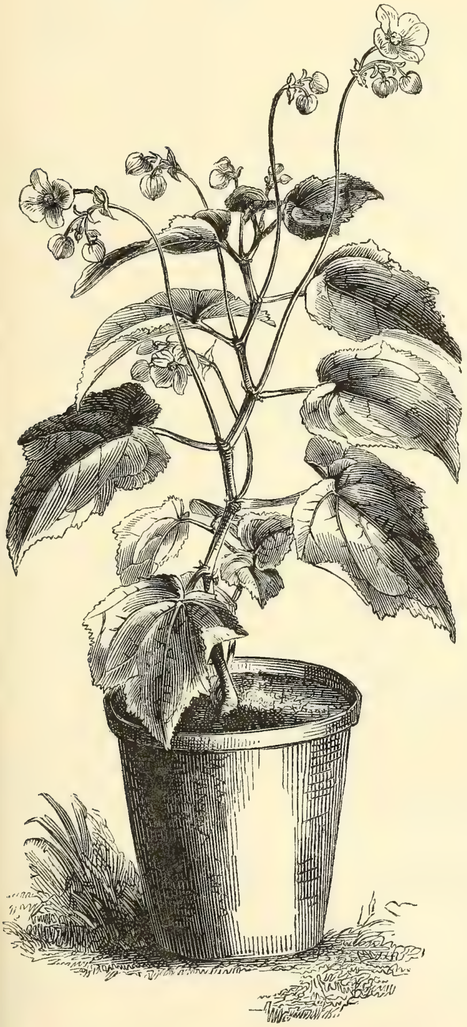
In the appendix to Mr. Reeves' ingenious observations on Miniature Fruit Trees, there is a plan for protecting Peaches and Nectarines well worthy of attention, and which we have no doubt will in time be modified so as to prove a cheap and useful means of protection and acceleration.

MISCELLANEOUS.

New and Rare Plants in Flower. *Begonia cinnabarina.* In the accompanying vignette, our artist has supplied a faithful portrait of a young specimen we recently noticed in flower in Messrs. Henderson's Nursery, Pine-apple Place.

Since its introduction, until within a very recent period, this beautiful species has enjoyed the appropriate specific distinction of *aurantiaca,* but we have just learned from Messrs. Henderson that Sir William Hooker has renamed it as above.

It is one of the handsomest of this showy tribe, and additionally valuable on account of its adaptation for greenhouse culture.



Like *Begonia Evansiana,* it is a bulbous rooted species of good habitude, with orange-scarlet inflorescence conspicuously erected several inches above luxuriant foliage of a rich and glossy verdure. Bolivia in South America is its native country; its flowering season under greenhouse cultivation commences soon after midsummer, and continues profusely, Messrs. Henderson informed us, until the approach of winter.

It is one of the rarest plants at present blooming in the Pine-apple Place Nursery, where we also noticed a good trellis specimen of

Thunbergia grandiflora. This noble old stove climber has been discarded from not a few collections, on account of the difficulty not unfrequently experienced, in inducing it to blossom freely, and even in the hands of some of our best cultivators it flowers but sparingly; but we are inclined to the opinion that the supposed shy blooming tendency of this plant may be traced to the circumstance of its not being generally placed in suitable conditions.

The specimen we saw at Messrs. Henderson's was enjoying the rudest health and flowering freely, and the following is the treatment, we were informed, as being most conducive to its well-doing.—A not too extensive, nor over nutritious rooting medium, effective drainage, comparative drought during winter, and, on the other hand, most liberal waterings and syringings throughout the active season.

Babingtonia Camphorosma. A very pretty heath-like Swan River shrub, suitable for greenhouse culture. We noticed a fine specimen of it in bloom in the Pine-apple Place Nursery, about eighteen inches high and two feet diameter. The branches are very long and slender, clothed with Erica-like foliage, and towards their extremities the pretty pinkish-white inflorescence is produced copiously. The general aspect of the plant is very graceful when the branches have attained their full length, and it freely thrives under the treatment generally given to the more delicate section of New Holland genera.

The modern system of "bedding out" half hardy plants and many genera originally confined to greenhouse culture, has opened a wide additional field for our enterprising nurserymen.

Messrs. Henderson's establishment in the Wellington Road, St. John's Wood, is especially rich in new and valuable subjects suitable for the summer and autumnal decoration of the modern pleasure-ground and parterre, amongst which we observed some surpassingly beautiful French Verbenas, which are to be seen to greater advantage, because planted out in beds in juxta-position with the sorts more generally employed; their respective habits and value being thus more readily appreciated. The following are a few of the best kinds we saw planted out:—

Verbena Apollon, a very clear dark violet purple, fine trusser.

Clotilde, beautifully striped and variegated with pink and white, and a very constant profuse bloomer.

Morphée, rich blue, with conspicuous white centre, good habit for bedding.

Remarkable, the best deep blood-red colour we are acquainted with, and a fine trusser.

Ariadne. A rich creamy buff or apricot colour, good habit.

Beauty of Stowe. Colour blush, with bright pink centre. This is a remarkable dwarf, compact growing Verbena, the individual trusses very large and fine.

General Brea. A deep rich maroon colour, good habit.

War Eagle. A dark scarlet with maroon centre, capital truss.

Iphigène. Pale lilac, dark rosy centre, good for bedding.

John Salter. Orange-scarlet, with crimson centre. This is a splendid variety for bedding, whether for habit, colour, or size of truss.

Eclipse. Ground-colour a delicate pink, with a broad, well-defined stripe of deep rose in the centre of the corolla. An excellent variety for the flower-garden.

Emperor of China, dark velvety crimson, very distinct, and a good bedding variety.

Amongst other plants suitable for flower garden decoration which we noticed in the Wellington Road Nursery, may be mentioned the following:

Antirrhinum " Queen Victoria." A very fine one, with light ground, yellow eye, the upper portion of the corolla richly stained with carmine.

Lobelia azurea grandiflora. A fine blue flowering, dwarf-branching variety, well adapted for bedding.

Salvia azurea compacta. A very pretty dwarf and free-blooming sort. Grows about a foot high, with azure-blue flowers, pencilled with clear white on the lower lip of the corolla. This is a very neat growing Salvia, and will be found a valuable addition to the list of decorative plants.

Phlox depressa. A hybrid between Phlox Drummondii and one of the best hardy herbaceous kinds; of a free, robust and procumbent habit, having fine dark green leaves, and producing from May until October large corymbs of bright rosy purple flowers, This is a desirable and valuable acquisition for bedding purposes.

Gloxinia " Professor Decaisne." A continental variety, with dark green leaves conspicuously veined with white. It is a profuse bloomer, the flowers being of a rich rose colour as regards their external aspect, and the lower part of the interior of the corolla is of a creamy white, the upper portion stained with rosy crimson. A very pretty *Gloxinia* imported by Messrs. Low of the Upper Clapton Nursery, where we noticed it in bloom.

Hoya campanulata. A vigorous young trellis specimen in perfect health of this pretty Hoya was recently flowering in the stove of S. Rucker, Esq., Wandsworth.

It is one of Messrs. Veitch's introductions, and probably the circumstance of its being considered a shy blooming species will account for its not being more generally met with in collections.

But if so this is a mistake. Mr. Mylam states that he experiences no difficulty in flowering it, by affording it the treatment ordinarily given to stove climbers, an exemplification of which consists in the specimen under notice, which was exhibiting upwards of a dozen developed and unexpanded bunches of its creamy-yellow, waxy, lucid, bell-shaped flowers depending on slender foot-stalks from the axillæ of its dark-green leaves.

Pentstemon cordifolius. At the last meeting of the Horticultural Society in Regent Street, plants of the above were produced from the Gardens of the Horticultural Society and from Messrs. Henderson's Nursery, Wellington Road.

The subject of our notice is a new and somewhat shrubby species with brownish orange flowers, introduced from California, by the Society's collector, Mr. Hartweg.

Oxalis elegans. At the meeting just alluded to, flowering-specimens of this beautiful half-hardy Oxalis were produced by Messrs. Veitch of Exeter. The inflorescence, which is reddish rose, or deep rose-colour, with rich purple in the centre of the flowers, is produced in profusion, forming a striking contrast with the rich green of the foliage. It is usually grown as a greenhouse plant, although Messrs. Veitch sent floral specimens from the open ground, much finer than the greenhouse produced; from which it may be inferred it will prove valuable as a flower-garden plant in summer.

Scutellaria Ventenatii. A fine plant of this distinct and beautiful species is at present flowering in the nursery of Messrs. Rollinson, of Tooting. The specimen is about 2 feet in diameter, composing a fine mass of terminal spikes of brilliant scarlet flowers; and in this condition we were informed it had been for the last six weeks. In winter an intermediate, or rather warm greenhouse or conservatory is requisite for it; but throughout the summer and early autumn, a cold greenhouse, or even a favourable aspect out of doors, is more conducive to its successful management. For autumnal decoration, whether in doors or out of doors, it is an invaluable, though rather scarce plant; and as it only demands the treatment accorded to greenhouse subjects in general, to grow and flower it as well as Messrs. Rollisson, no collection should be without it.

Allamanda grandiflora. A good plant of this shrubby species we observed displaying its conspicuously large pale yellow flowers in Mr. Glendinning's nursery, Turnham Green. The absence of the climbing propensity, and the large size of the flowers individually, in conjunction with its bushy (compared with other members of the family) habit of growth, render the above a desirable adjunct to every stove collection.

Pelargonium "perpetual scarlet." A brilliant sort, with the above distinction, was pointed out to us in the nursery of the gentleman just alluded to, as being specially adapted for winter display, or for "forcing" at that season, for which latter purpose it was mentioned as being the "best scarlet in cultivation." If so (and its appearance is undoubtedly very prepossessing in this respect) it will become an indispensable variety wherever forced flowers are in request.

Erica inflata compacta. This is a seedling (in the way of *E. jubata*), and which, together with several first-rate seedlings obtained by hybridisation with *E. obbata, jubata* and *ampullacea,* we were recently favoured with the inspection of in bloom in Mr. Glendinning's Nursery, Chiswick, and whether the *size* and *profusion* of inflorescence, or their very compact habit of growth, be taken into consideration, they are undoubtedly splendid acquisitions, and when "brought out" by-and-by, we opine will be found surpassing some of the best heaths at present foremost in cultivation.

Zauschneria californica. A superb specimen of cultivation of this highly ornamental novelty, gaily and profusely decorated with its brilliant scarlet flowers, was lately blooming in a pot in the open air, in the gardens of the Horticultural Society.

A bed of it was also shown to us, and a fine thing it unquestionably is for massing; but valuable as it will prove under any circumstances for "turning out" purposes, its utility and not improbably ornate character also, will be greatly enhanced for Flower-gardening, if (as Mr. Gordon is inclined to suppose) it should eventually be found to stand the ordinary severity of our winters in the open border with a slight protection.

Amongst new plants in the gardens of the Horticultural Society, we observed the shrub-like

Pentstemon cordifolius, before alluded to, and which Mr. Gordon expects will prove hardy. Also—

Calceolaria cuneifolia, a shrubby species, with lemon-coloured flowers in the way of, but the corolla not so *gaping* as the old *C. bicolor.*

It was introduced from Bolivia in 1846, and from its compact, bushy manner of growing will doubtless be found useful for the open air, and the more so, because a great fault with the better flowering kinds in use for bedding, is their excessive brittleness, and consequent incapacity to withstand rough weather, without being supported artificially.

NEW AND BEAUTIFUL PLANTS FIGURED IN THE BOTANICAL PERIODICALS.

Capparis membranacea. *Membranous Caper-bush.* A new species collected in Mount Victoria, in the island of Hong Kong, by Captain J. G. Champion, 95th Regt. It belongs to the same section as *C. Ceylonica* and *C. horrida,* and will range along with *C. quiniflora.*—*Hook. Jour. Bot.* 242.

Clematis parviloba. *Small-lobed Clematis,* discovered also by Capt. Champion, growing towards West Point, Hong Kong. It produces its flowers in Spring, and is apparently nearly allied to *C. acuminata.*

Dielytra spectabilis. *Moutan Dielytra.* A fine new herbaceous plant, from China, probably quite hardy. It was figured by us in our "Mag. of Bot." in July, 1848.

Friesia Chinensis. *Chinese Friesia.* Collected by Capt. Champion in Hong Kong.

Gaultheria bracteata. *Bracteated Gaultheria.* Among the most interesting of mountain plants in the tropics and in the southern hemisphere, especially of the New World, are the various species of *Gaultheria.* The present one is from the Andes of Columbia, and was sent to the Royal Gardens and to Syon by Mr. Purdie. It should be grown in light peat soil, and kept in a cool airy pit or frame during winter, and in summer should not be exposed too freely to the sun in hot weather.—*Bot. Mag.* 4461.

Lacepedea insignis. *Fragrant Lacepedea.* A really handsome shrub, attaining a height of 14 to 18 feet, with ample evergreen foliage and panicles of white, deliciously scented flowers; each blossom the size of, and in shape not much unlike, a barberry. It is a native of Mexico, requires the heat of a stove where the flowers come to perfection in May. It is readily increased by cuttings, placed in bottom-heat under a bell-glass.—*Bot. Mag.* 4459.

Mitraria coccinea. *Scarlet Mitraria.* A very handsome hardy shrub, with scarlet tubular flowers, figured in the *Magazine of Botany,* xv., *Bot. Mag.* 4462.

Nematanthus Ionema. *Dark blood-coloured Ionema.* This is the most striking of all the species of *Nematanthus* known in cultivation, remarkable for the great length of the flower-stalks, the deep blood-colour of the corollas, the rich purple of the calyx tube, and the pubescence on these latter. It is said to grow in the primeval woods of Brazil, between Ilheos and the town of San Pedro de Alcantara. It is a succulent climbing shrub, and requires the heat of the stove.—*Bot. Mag.* 4460.

Pentaphylax euryoides. A *Ternströmiacious* plant, a native of Hong Kong, where it was discovered and collected by Capt. J. G. Champion.—*Hook. Jour.* 244.

Botany of Western Australia, by Mr. James Drummond. I have now collected three hundred species, principally on the Perongarup and Toolbranup hills, and in the vicinity of Cape Riche. To the *Leguminosæ,* the most numerous order in Australia, I have made many additions. One of the most beautiful plants I have seen is, I suppose, a species of *Gastrolobium,* which I call *G. Leakeanum.* It grows 12 to 15 feet high, with opposite leaves 3 inches long by 2 broad, and bears clusters of large deep-scarlet flowers in the axils of the leaves; it is abundant on Congineerup, near the east end of the mountain, growing in all sorts of soil, from the base to the summit. The banks of the Salt River and its tributary streams produce a fine species of *Brachysema,* allied to *B. latifolia,* but with larger leaves, which have longer points. It is an upright-growing plant, producing its flowers on the shoots of the preceding season. They are borne on short footstalks, five or six in the axils of each leaf; they are large, and bright scarlet. The fine foliage of this plant, silvery underneath, and the great number of its flowers, in which it differs greatly from the other species of the genus, make it one of the finest plants of the order to which it belongs.

I found on the Congineerup a remarkable leguminous shrub, bearing, instead of leaves, large glaucous *phyllodia,* somewhat resembling *Acacia gamophylla,* but having yellow papilionaceous flowers. I could see nothing of the old or young seed-vessels. The plant is very rare on the Congineerup, near the east end of the mountain. To the *Myrtaceæ,* and particularly to the sub-order *Chamelauciæ,* I have made most important additions. A beautiful and apparently nondescript genus, near *Actinodium,* but differing from it in having the outer flowers of the heads forming a ray, like many composite plants. I gathered two species of the genus in my last journey to the south, both fine plants, but the one now found much surpasses the others: it grows as an upright shrub, from 2 to 3 feet high, with small imbricated, heath-like leaves; the heads of the flowers are borne in corymbs from 1 foot to 18 inches in diameter, each head of flowers, including the ray, about 2 inches wide. There is a curious resemblance between these heads of flowers and a fine double daisy (*Bellis perennis*); the colour varies from white to various shades of rose-colour. Several fine species of *Chamelaucium* have been found, one with flowers as large as *Verticordia insignis.* The flowers are white when they first come out, but before they go off they change to a fine purple.

To the now splendid genus *Genetyllis* I have added four additional species. The tulip-bearing *Genetyllis*, discovered and described in my last journey, I gathered in flower on Mongerup. I had only seen it when the seeds were ripe, and although it was then beautiful, it now surpasses my former description. Along with it, on Mongerup, I found a species with heath-like leaves, a bright scarlet involucre, inclosing dark-purple flowers. On Congineerup I found two large-bracted species of this genus: one with thyme-like, ciliated leaves, and the bracts which form the involucre ciliated; the other with heath-like leaves and bracts without ciliæ; the bracts in both are rose-coloured. In my first ascent to Toolbranup, I found a scarlet fuchsia-like *Genetyllis*, but saw only a few specimens, which I lost on the mountain. It was burned over last year by the natives, and where the *Genetyllis* and other rare plants grew, there is nothing to be seen but stones and blackened stumps. When we consider that the involucres of these plants resemble corollas of the same size, it will be seen that they are highly ornamental before the flowers expand, and they retain their beauty in a great degree until the seeds are ripe. Their fragrance is at least equal to the *Hedaroma latifolium* of Lindley, which is the *Genetyllis citriodora* of Endlicher; they are most desirable plants to introduce into cultivation. Two fine species of *Calythrix* have been found; one of the largest yet seen of the genus bears rose-coloured flowers, which become white before they go off; and one with reddish-purple flowers—a fine plant. To the true *Myrtaceæ* many plants have been added. A *Hypocalymna* grows on Congineerup, in the woods at the east end of the mountain, a faithful drawing of which, leaves, flowers, and branches, might very well pass for the broad-leaved Italian myrtle. There is also a beautiful purple species of the *Cardiomyrtus* section of this genus, which I observed on all the Toolbranup hills.—*Hooker's Journ. Botany*, 247.

CALENDAR OF OPERATIONS FOR SEPTEMBER.

FRUIT AND VEGETABLE DEPARTMENT.

Glass.

Cherries, Figs, Peaches, and Vines in tubs or pots for early forcing, should now be placed in as cold a situation as can be procured, that their rest previous to being started into growth may be as perfect as possible. It will be necessary, however, to protect the roots with litter, to prevent the possibility of injury from early frosts.

Grapes in late houses, if not colouring well, should have a little fire in the day-time for a few hours, but a very free circulation of air must be kept up, and a portion continued during the night.

Pines for succession, grown in pots, should now be shifted. September is the usual month, but late potting is never to be recommended. Water those with liquid manure which are swelling up, and see that both bottom and top heat is good. Let the atmosphere be kept moist, and give a free circulation of air. Successive plants however must have less humidity, syringing must be abandoned, a good proportion of air supplied, and the temperature lowered to prepare the plants for winter; the dung linings, also, should be renewed. Pot culture, however, of Pines will bear no comparison with the system of planting out in tanked beds.

Open Air.

Apple, Pears, and other fruits, as they become matured, should be housed, as if the autumn sets in very wet they do not keep well, it is always better to spread them thinly on shelves, and keep the fruit room cool, dry, and airy, especially for Pears this is highly advantageous.

Fruit Trees on walls (especially Peaches and Nectarines) at this time of the year often suffer from mildew and red spider: whilst the fruit are ripening, it is not proper to wash the trees with sulphur and water, but a little dry sulphur dusted over the leaves when wet will prevent further injury until all the fruit are gathered.

Amongst Vegetables the work is for the most part routine this month.

FLOWER DEPARTMENT.

Glass.

Conservatory and Greenhouse. All plants liable to suffer from wet which have been set out of doors had better be housed again by the middle of the month, as after that time no dependance can be placed on the weather, and any tenacious of moisture are sure to suffer injury.

Cyclamens and other similar plants should be repotted.

Heliotropes, Scarlet Geraniums, &c. should be placed in very airy situations, as should also Camellias and Azaleas. All dirty plants should be cleaned, as also should the pots in which they grow, otherwise a healthy habit cannot be maintained to meet the dark days of winter.

Amongst Stove Plants the Begonias must not be lost sight of, they are a valuable genus of plants for winter flowering. The more hardy kinds of stove plants, which were placed in a lower temperature in the summer, should now be restored to their old situations, that all developments may be fully ripened before winter, otherwise feeble or imperfect bloom may be expected.

Orchids, if we except those in a growing or flowering condition, will now be fast approaching a state of rest; bring them gradually into this condition by diminishing the proportion of water, moderating the heat, and giving a free proportion of air.

Open Air.

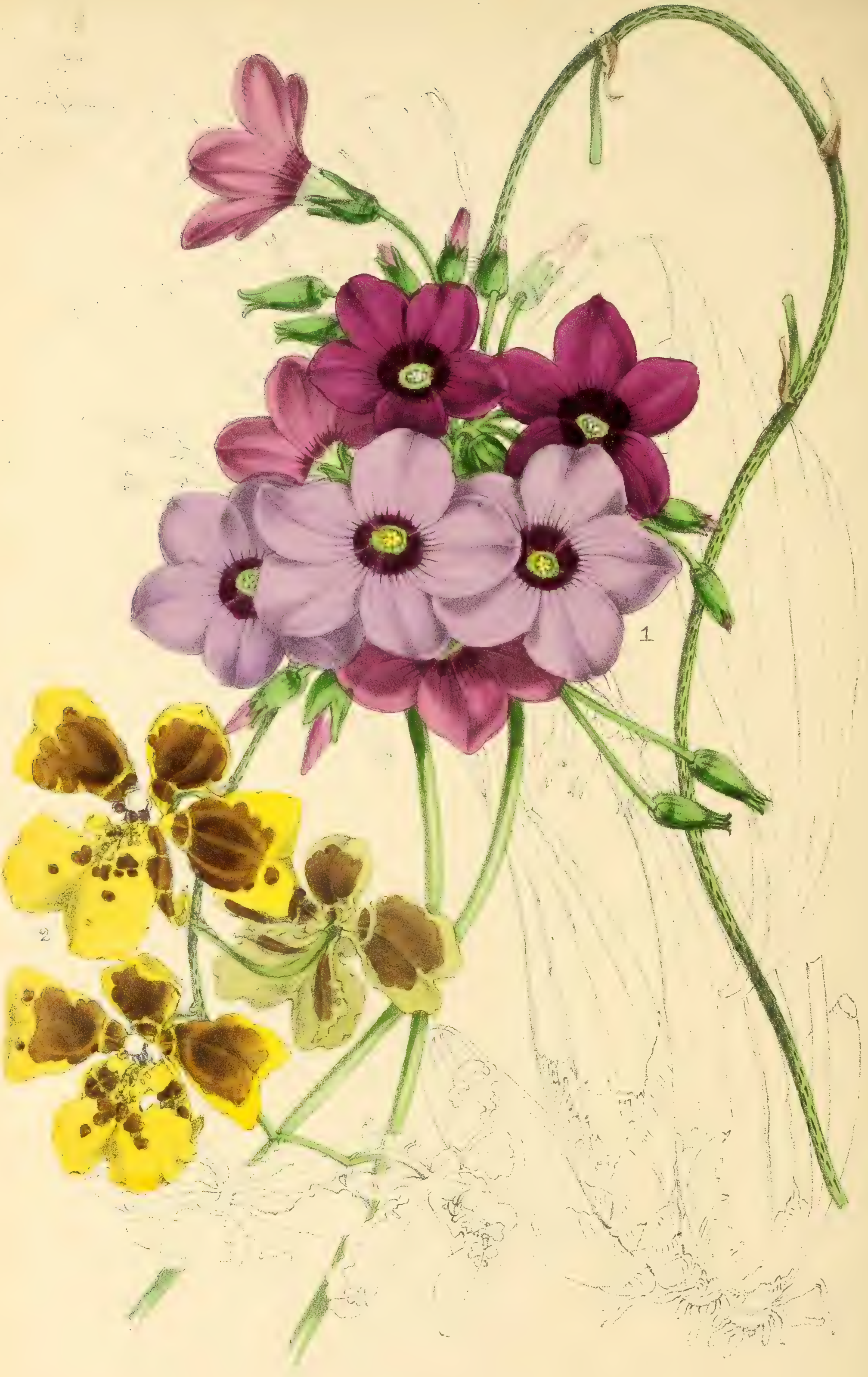
Bulbs for early forcing cannot now be got in too soon, a light rich soil, with a mixture of sharp sand, is the best compost. Plant shallow, and place the pots in a bed of coal ashes, and cover the whole over with two or three inches thickness of old tan; as soon as the buds begin to swell they may be introduced into heat, and an early bloom will be insured.

Young Stock for bedding out next summer in the flower-garden should not remain in the open air longer than the middle of the month, but should be placed in the pits or frames where they are intended to be protected for the winter; they will not, however, require any covering, except frosts or very excessive rains occur.

Roses may still be budded in the first week, but they do not succeed so well as if done in August.

NURSERY and FOREST-TREE DEPARTMENT.

Prepare for planting various kinds of both deciduous and evergreen trees, for all moderately dry situations no time is equal to autumn.



S. Holden, Del. & Lith

1. *Oxalis elegans.*
2. *Oncidium Rigbyana.*

PAXTON'S
MAGAZINE OF GARDENING AND BOTANY.

ONCIDIUM RIGBYANUM. (Mr. Rigby's Oncid.)

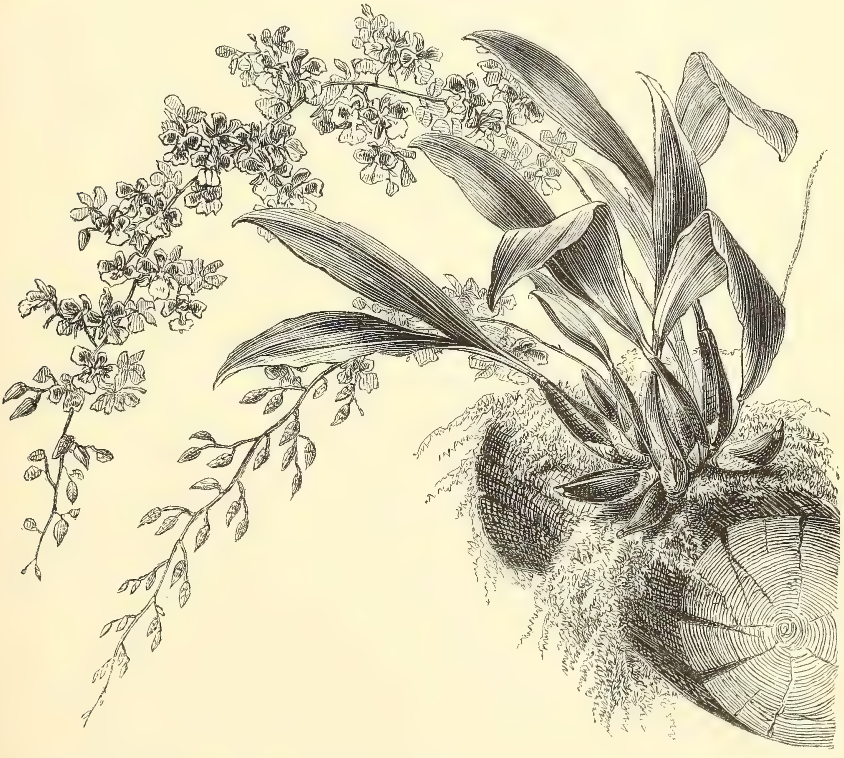
Class, GYNANDRIA.——*Order*, MONANDRIA.——*Nat. Order*, ORCHIDACEÆ.——(Orchids, *Veg. Kingd.*)

GENERIC CHARACTER.—*Perianth* showy. *Sepals* often undulated, lateral ones often connate with the lower part of the labellum. *Petals* similar. *Labellum* very large, spurless, continuous with the column, variously lobed, tubercled or crenulated at the base. *Column* free, semi-cylindrical, winged at the top on both sides. *Anthers* usually two-celled; *rostellum* sometimes shortened, sometimes elongated and beaked. *Pollen-masses* two, furrowed behind; *caudicula* plain; *gland* oblong.

SPECIFIC CHARACTER.—*Plant* an epiphyte. *Pseudo-bulbs* something cylindrical, three inches long. *Leaves* two or three on the summit of each pseudo-bulb, erect, lanceolate. *Flowers* paniculate. *Scape* one foot long. *Sepals* and *Petals* bright lemon-yellow, varied in the centre of each, with numerous dark-brown spots. *Labellum* large, spreading, two-lobed, somewhat curled at the edges, bright-yellow, spotted with dark-brown.

AUTHORITIES AND SYNONYMES.—Oncidium, *Swartz.* Oncidium Rigbyanum *of the Nurseries.*

THIS new Oncid was purchased by Mr. Henderson, of Pine-Apple Place, London, at a sale of the Nursery stock of the late Mr. Rigby, a plant-grower at Brompton, and is known in the nursery of the above-named gentlemen as *Oncidium Rigbyanum.*



As the plant appears to be quite unknown to botanists and orchid growers, we have adopted the nursery name in commemoration of its original introducer and possessor.

It was sent through a friend of Mr. Rigby's to Brompton in 1842, but from what locality, or by whom it was first discovered, we regret to say is unknown.

It flowers freely either fastened to a block or placed in a pot, requiring the same treatment as other Orchids. Messrs. Henderson have always kept it in a cool part of the house, and under this treatment it has flowered finely.

Our drawing was prepared in March, 1848, in the Nursery at Pine-Apple Place.

For derivation of generic name see page 65.

OXALIS ELEGANS. (Elegant Wood Sorrel.)

Class, Decandria.——*Order*, Pentagynia.——*Nat. Order*, Oxalidaceæ.——(Oxalids, *Veg. Kingd.*)

Generic Character.—*Sepals* five, free, or joined together at the base. *Petals* five. *Stamens* ten, with the filaments connected together a little way at the base, five of which are exterior, and are shorter than the other five. *Styles* five, usually crowned by pencil-like, rarely capitate, or bifid stigmas. *Capsules* pentagonal, oblong, or cylindrical.

Specific Character.—*Plant* a tuberous-rooted perennial. *Leaflets* three, broad, roundish-obovate, emarginate, fleshy, of a dark rich green above, but stained with violet purple on the under side. *Petioles* long, smooth. *Scapes* nine inches or a foot long, usually supporting five or six flowers each. *Flowers* large, of a bright rose colour, with a rich purple eye. *Styles* long. *Cells of ovary* four to twelve-sided.

Authorities and Synonymes.—Oxalis, *Lin. Gen.*, *De Cand. Prod.*; Oxys *Tourn. Inst.*; Oxalis elegans, *Humboldt & Kunth.*

This handsome Oxalis is thought to be quite hardy, and if this should prove to be the case, it must be esteemed a great novelty, on account of the brilliant show its flowers make in the open borders in summer. It is an introduction of Messrs. Veitch and Son, of Exeter, through their collector, Mr. William Lobb, who discovered it growing in the mountains behind Loxa in Peru.

When our drawing was made at the Exeter Nursery in August, 1848, the plant grew in the open borders, and appeared to be flourishing well; but its real value was not properly observed until this present summer, when a specimen was exhibited at the London Horticultural Society, and a prize of merit awarded. If the plant should prove quite hardy, (and it has stood out for two years without injury,) a more valuable addition to our dwarf perennial border flowers can scarcely be conceived, both the brilliant colour of the blossoms and the fine fleshy two-coloured foliage contribute to render it a first-rate plant.

With respect to culture, very little care is required; if the plant be turned out into a border of light rich soil, it will both thrive and increase. Notwithstanding, however, that Messrs. Veitch have found it bear the open air at Exeter for the two last years, it would be advisable for all persons in northern counties to give a slight shelter during the winter season; during the period of torpidity the tubers should always be kept quite dry.

The generic name is derived from *oxys*, sharp, or acid, from the large quantity of acid contained in the leaves.

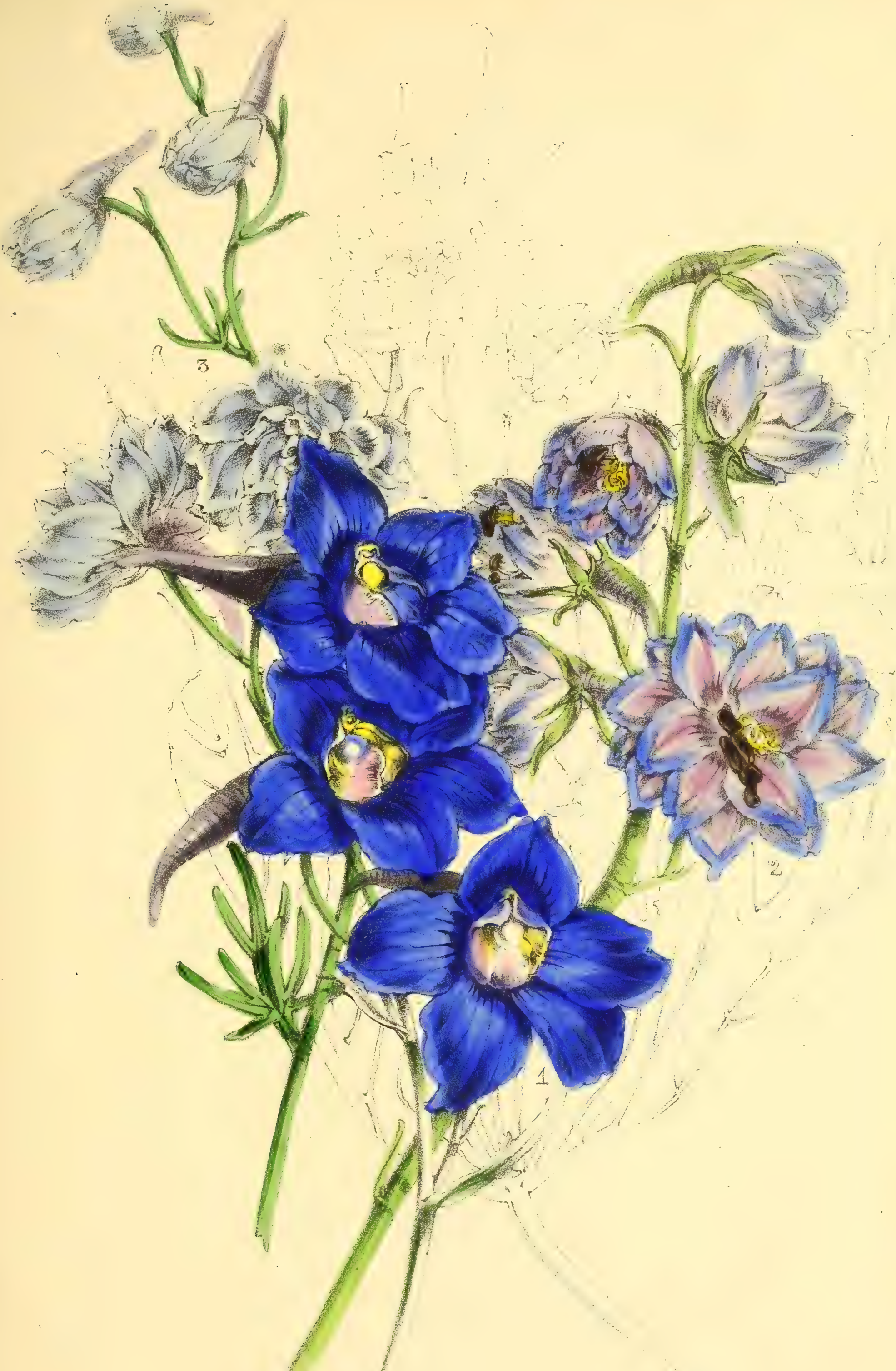
DELPHINIUM MAGNIFICUM. (Magnificent Larkspur.)

Class, Polyandria.——*Order*, Tri-Pentagynia.——*Nat. Ord.*, Ranunculaceæ.——(Crowfoots, *Veg. Kingd.*)

Generic Character.—*Calyx* deciduous, petal-like, irregular, with the upper sepal drawn out below into a spur. *Petals* four; two upper ones drawn out at the base into appendages within the spur.

GARDEN HYBRID.

This fine hardy herbaceous perennial was raised from seeds by Mr. Godwin, of the Collycroft Nursery, near Ashbourne, in August, 1847, and where it flowered during the whole of the summer of 1849.



S.Holden Del. & lith.

Delphiniums.

1 magnifica. 2 cærulescens flo: ple: 3 azurea.

The plant forms a tall, erect, branching herb with a fine spreading habit. The leaves are stalked, and the cauline ones are palmately multifid. The flowers are paniculately racemose, and produced in a long succession, being still (September) finely in bloom, and having numerous lateral branches containing abundance of unexpanded buds. The sepals are of the most brilliant blue, and in the words of Mr. Godwin, the plant "has been a truly magnificent object since the 17th of June."

The cultivation of this kind, like that of all the other perennial Larkspurs, is simple and easy: they all grow with the greatest freedom in any common garden soil, and are propagated by division of the roots and by seeds; the former is the best mode for the increase of any choice kind, as from the disposition of the sorts to sport with each other, it is seldom the offspring resemble the parent plants.

Our drawing of this handsome Delphinium was made from a specimen, forwarded from the Collycroft Nursery, by Mr. Godwin, in August last.

2. Delphinium cœrulescens flore pleno. Double bluish Larkspur.

3. Delphinium azureum. Azure blue Larkspur. Both of these flowered in the nursery of Messrs. Henderson, Pine-apple Place, Edgware Road, London, where our artist made the drawings, in July last.

The generic name is derived from δελφιν, *delphin*, a dolphin, on account of the supposed resemblance between the nectary of the plant, and the imaginary figure of the dolphin.

CHEMISTRY OF HORTICULTURE.—WATER.

By John Towers, Esq.

(Continued from Page 231.)

By referring to page 134, June, it will be perceived that enough has been said to prove that Water can be made to develope the two elementary gases, Hydrogen and Oxygen, in the proportions of two volumes of the former to one volume of the latter; and hence, that it must consist of the bases of those two gases, in the liquid form. These facts are established by chemical evidences, which admit of no doubt, and therefore it will be needless to dwell farther upon them. The properties and qualities of Water claim however the most serious investigation. In its natural or fluid form, it may be considered the first revealed, if not the parent of all created matter, but therein it is capable, by its great solvent power, of uniting with a vast variety of foreign substances, which materially affect its qualities, and interfere with the successful cultivation of plants. By the application of heat Water is converted into steam, in which state it appears to occupy 1728 times its original volume. Steam is a vehicle of electricity, and its particles are for a time separated by the repulsive power of that agent. Ice, during congelation, occupies more space than fluid water; it conducts electricity, and may, indeed, when reduced to an extremely low temperature, be made to produce electric phenomena. In "Griffith's Chemistry of the Seasons," it is said to act as a burning glass, for if a plano-convex lens, that is, a hemisphere of ice, with a true and polished flat surface, be prepared according to the process therein described, and moved about at the distance of a few inches from a piece of German tinder, the latter will kindle, and thus afford another fact to prove "that the solar rays have been collected to a focus, and have lost no heat in their passage through ice at 32°." The plane surface should, in this experiment, be presented to the sun.

Much attention has recently been given to the composition of Water by the commissioners appointed to investigate the health of towns, and results of considerable interest have been obtained.

Pure Water, such as is procured by the deflagration of the two water gases previously developed by the galvanic decomposition of common water, is rarely to be met with; nor would it be of any value either to the gardener or housekeeper.

Water distilled from stone or glass vessels, free from metallic contact, might represent it, but neither the one nor the other would be fit for the table, being void of the air which is required to confer briskness of flavour. *Rain* Water is by no means free from impurities, particularly those derived from soot conveyed into the atmosphere. Hence, the presence of volatile carbonate of ammonia that can be detected by chemical re-agents. Locality must in a great degree affect the character of Rain Water, which accordingly, is said to yield traces of some muriates, of free muriatic and nitric acid, carbonic acid, carburetted hydrogen, and also of minute quantities of the metals, iron, nickel, and manganese.

Rain Water collected chiefly by the roofs of glazed erections, and retained in underground tanks, exposed to the influence of air by gratings, is one of the chief resources of the gardener, unless he happily is supplied with a rill, or other constant source of sweet, soft Water, which is almost invariably impregnated with some portions of vegetable or animal matter.

River Water varies much in quality; if it originate in springs, augmented by Rain Water, and flow over a granitic or stony channel, it may be very pure, and sufficiently soft for all the objects of horticulture. The Water of the Thames has lately become the subject of much solicitude, in consequence of the numerous adventitious impregnations of a disgusting nature from the sewage of the Metropolis. I do not pretend to interfere with the plans of improvement now contemplated, particularly those suggested by Mr. Jasper Rogers, which embrace considerations of vast moment, involving not only the public health, but the prosperity of agriculture. But, so far as chemical agency is concerned, it will be requisite to enter somewhat at large upon the means by which it is proposed to effect the improvement of hard Waters, and thus, at once, to correct one of the great inconveniences to which many gardeners are inevitably subjected.

Hardness of River and Spring Water varies exceedingly: it is generally occasioned by chalk, in different quantities, held in solution by carbonic acid. Professor Clark, of Aberdeen, has conferred great benefit upon the public by his able report of a process by which the hardest Waters can be rendered comparatively soft, so as no longer to destroy much soap before a lather can be produced; and consequently fitted for the purposes of horticulture. In a recent investigation of the very defective Waters in and about Croydon. many facts came to light, the discovery of which afford promise of great amelioration. In the first place, chemical analyses have proved that the Water from wells situated in different parts of the town contained chalk, some to the extent of 48°, others diminishing through various grades, to 22° and 17½° of hardness, "each degree indicating as much hardness as would be produced by one grain of chalk per gallon."

If, then, the waters of Croydon, within the radius of a circle short of 1 mile from its centre, evidence so much variety, we may safely conclude that other localities are in a similar predicament with respect to the Waters in ordinary use.

River Water, if we assume that of the Thames and New River as a standard (to say nothing of the taint acquired from foul impregnations), contains far too large a quantity of chalky matter. Dr. Clark stated that, "One hundred gallons of the Waters of London supplied by the Companies, take from twenty-four to thirty-two ounces of the best curd-soap in order to form a lather of such consistence as to remain all over the surface for five minutes."

By his new process (and its theory) shortly to be described, Dr. Clark proposed to reduce the hardness of the London Waters, so far that about one-third of the soap now required, should suffice to produce a complete lather similar to the one above alluded to.

Theory.—Chalk is almost, or altogether insoluble in water, but it may be rendered soluble by two processes of a very opposite kind.

1. When burned in a lime-kiln, chalk and lime-stone lose weight. If dry and pure, the pound of sixteen ounces will produce only nine ounces of completely burnt lime, therefore, seven ounces have been driven off by the fire, and these seven ounces consist of carbonic acid—that aërial gas which was noticed in an article on atmospheric air. Chalk so burnt becomes quick lime, of which the aforesaid nine ounces will be soluble in *pure* water, but they will require not less than forty gallons of such water for their complete

solution. The solution so obtained is termed lime-water, and this, when fresh made, and secured from any contact with air, is perfectly clear and colourless.

2. To dissolve one pound of pure chalk in Water, and thus to imitate that *hardness* which exists in the Water of streams and wells, the pound of chalk must not only retain the seven ounces of carbonic acid that it contains as a simple carbonate of lime, but it must combine with a second equivalent of carbonic acid, that is, with seven additional ounces, to bring it to the condition of a double, or *bi*-carbonate of lime. "In such a condition," says Dr. Clark, "chalk exists in the Waters of London, dissolved, invisible, and colourless, like salt in Water. A pound of chalk, dissolved in 560 gallons of water by seven ounces of carbonic acid, would form a solution not sensibly different, in ordinary use, from the filtered water of the Thames, in the average state of that river." Again:—

"*Any lime-water* may be mixed with another, and any solution of bicarbonate of lime with another, without disturbing the clearness of either. Not so if the most pellucid lime-water be mixed with a clear spring or river Water, rendered *hard* by chalk existing in it, as a bicarbonate of lime. At first a haziness appears, which deepens into a milkiness, carried on till the mixture resembles a thin whitewash. The white particles of chalk gradually subside, leaving the Water above perfectly clear."

The chemical tyro should investigate the facts stated, and compare them with practical results. Dr. Clark thus applies his theory:—"If we suppose that one pound of chalk after being burned to nine ounces of quick lime, be dissolved so as to form forty gallons of lime-water: that another pound is dissolved by seven ounces of extra-carbonic acid, so as to form 560 gallons of a solution of bicarbonate of lime, and that the two solutions are mixed, making together 600 gallons; then the nine ounces of quick lime already in solution in the forty gallons will unite with the seven extra ounces of carbonic acid that hold the pound of chalk, dissolved in the 560 gallons of Water. Those nine ounces of caustic lime, and seven ounces of carbonic acid attract each other, unite to form sixteen ounces of chalk (simple carbonate of lime), which being insoluble in Water, becomes visible immediately on its being formed; at the same time that the other pound of chalk (of the 560 gallons) being deprived of the extra seven ounces of carbonic acid that kept it in solution, re-appears. Both pounds of chalk will be found at the bottom after subsidence. The 600 gallons of Water will remain above, clear and colourless, without holding in solution any sensible quantity either of quick-lime or of bicarbonate of lime." So far, almost verbatim, the theory of Dr. Clark's patented process, which any one may bring to the test who can obtain pure Water and quick-lime. Minute accuracy cannot be expected from ordinary lime and impregnated Waters, but the essential facts can be verified. I once knew two large gardens, one, that of a gardener in Buckinghamshire, where, for want of a rill or other source of soft water, the plants were supplied from a well. On such occasion, the hard Water was exposed in tubs for hours; thus a portion of carbonic acid was liberated, and a corresponding quantity of chalk deposited. A few grains of pure, fresh, quick-lime stirred into a gallon of such Water would soften it without adding a particle of lime to the fluid. So far as horticulture is concerned, it is to be regretted that the process is patented, and therefore cannot be safely adopted in the great way; but ere long we hope that all towns will be supplied with purified water.

But hardness may not entirely depend upon chalk. I have detected gypsum (sulphate of lime) in water, to an extent sufficient to render it destructive of the lead bottoms of cisterns. The test for this substance is any one of the neutral salts of baryta, dropped into the clear water after it has deposited the carbonate of lime. After what has been said in the course of this article, we presume that no one will doubt the great utility of analytic chemistry to horticulture, and it is to be hoped that our rising young men will turn their serious attention to the science.

THE ROSE.

Pliny has in a great measure followed the footsteps of Theophrastus, and repeats the characters mentioned by that author by which Roses may be distinguished. In speaking of the Rose generally, Pliny thus describes it:—"The Rose grows upon a thorny rather than on an herbaceous plant, it grows also upon a plant resembling a bramble. Then it has an agreeable smell, but not perceptible at any great distance. The whole flower sprouts at first enclosed in a calyx full of seeds, which in a short time swells and becomes pointed at the summit and in shape resembles green alabastri. Gradually the flower grows, opens and expands itself, containing in the centre of its calyx the erect yellow stamina." He then proceeds to enumerate eleven kind of Roses which he says were well known to the Romans. They are the following:

1. Rosa Prænestina.
2. R. Campana.
3. R. Milesia.
4. R. Trachinia.
5. R. Alabandica.
6. R. spineola.
7. R. centifolia.
8. R. Græca
9. R. Græcula.
10. R. Moscheuton.
11. R. coroneola.

Six other kinds of Roses are mentioned by this writer in different parts of his Natural History, but of these he does not give any description, probably because they were not in such general repute as the others above-mentioned for ornamental purposes, though esteemed somewhat for their medicinal properties. The kinds thus incidentally alluded to, are

1. R. alba.
2. R. pallida.
3. R. præcox.
4. R. spinosa.
5. R. sylvestris.
6. R. quinquefolia.

Of the first two kinds of the eleven more particularly noticed by Pliny, the Campanian was the earliest in flower, and the Prænestine the first which ceased from blowing.

The Milesian Rose was of a very bright colour, and consisted of not more than twelve flower-leaves; it was the latest which came into blossom.

The Trachinian Rose was less red than the Milesian.

The Alabandic Rose had flower-leaves the colour of which inclined to white. It was less valued than the preceding kinds.

The R. spineola had a large number of very small flower-leaves, and was the least esteemed of all these kinds of Roses.

The Hundred-leaved Rose had many small petals.

The R. Græca appears not to have been a Rose, and was known to the Greeks, it is probable, under the name of *Lychnis*. A plant mentioned by Dioscorides under the name of *Lychnis stephanomatick*, or Lychnis coronaria, may be considered as the plant enumerated by Pliny among his Roses, and was probably included with them as being a flower used in wreaths or crowns. Dioscorides says that the Lychnis resembles the white violet, but it is of a purple colour. Pliny also says, that in size it equalled the violet, grew only in moist places, and that it was without any fragrance. The R. Græca may perhaps be reasonably considered as a species of the genus Lychnis, commonly known as the Rose-campion.

The R. Græcula had very broad flower-leaves which were rolled or convoluted into the form of a ball; they did not unfold themselves except when forced to do so by the hand, and presented an appearance of always growing.

The R. moscheuton had flower-leaves resembling in form the Olive-fruit, and grew upon a stem similar to that of the Mallow.

The R. coronella was an autumnal Rose and when compared with other kinds of Roses, had a middle-sized flower.

All of the above-mentioned Roses were, according to the statement of Pliny, destitute of fragrance with the exception of the R. coronella, and that which grew on the bramble-like plant, and this absence of fragrance he alleges to be caused by some treatment they underwent, which is not very clearly explained by him.

Mentzelius regards the Prænestine, Trachinian, and Milesian Roses, as varieties of a Rose called by him, Rosa rubra saccharina, which latter he considers to be the same as the Rosa Græcula of Pliny. Clusius and Mentzelius also, call the Milesian Rose, the *Rose de Provence.* Ferrarius in his work entitled, "Flora, seu, de Florum Culturâ," states that the Rose known to him as the Rosa alba multiplex, has been by different writers regarded as either Rosa Campana, Alibandica, or spineola of Pliny, while by others, the last mentioned Rose and the Rosa coronella have been thought to resemble the Rosa damascena multiplex.

Among the less esteemed Roses mentioned by Pliny, is the Rosa sylvestris, called also by him Cynorrhodon, which grew upon a briar and had a leaf resembling the impress of a man's foot. It bore a black berry. Among the thorns of the stem of this Rose grew a round sponge-like substance resembling a chestnut, the presence of this was particularly noticed upon this Rose-tree, and contained a worm or grub which produced, or from which issued, the insects called Cantharides. These insects are said also by Aristotle to come from a worm found upon the Cunacanthe or "Dog-Briar."

In the spongy substance alluded to, we recognise the moss-like prickly excrescences which are found more or less upon all wild Rose-trees, but especially upon the stems of the Dog-rose, and which are caused by, and form the habitations of, the insect known as the Cynips Rosæ.

Commentators on Pliny regard the Rosa sylvestris of this author to be the Rosa Eglanteria of Linnæus, now the Rosa rubiginosa, which according to Fries, Linnæus for a long time referred to the species Rosa canina.

The Rosa sylvestris appears to have obtained its synonymes, *canina* and *cynorrhodon* from a supposition that its root was an efficacious remedy for the bites of mad dogs: an instance of its supposed curative powers is mentioned by Pliny.

The Rosa præcox grew, according to Pliny, at Carthage, at which place it bloomed during the whole winter.

It is remarkable, considering the esteem in which it was held, and the fragrance which it possessed, that Pliny has not mentioned, or indicated among those he has noticed, the Pæstan Rose, so often referred to with admiration by the Roman Poets. There appear to be no detailed accounts existing of this Rose, and we are left to obtain our information of it from the poetry of Virgil, Propertius, Ovid, and Martial, who frequently allude to the extreme beauty of its colour and fragrance, to its blooming twice a year, and its abundance in the rosaries of Pæstum, where it was especially cultivated. At the time Mr. Swinburne visited the ruins of Pæstum he mentions having found a Rose there, to which he alludes in the following extract from his "Travels in the Two Sicilies." "The Pæstan Rose," he says, "from its peculiar fragrance, and the singularity of its blowing twice a year, is often mentioned with predilection by the classic poets. The wild Rose which now shoots up among the ruins is of the small single damask kind, with a very high perfume. As a farmer assured me on the spot, it flowers both spring and autumn. Subsequent to the time of Pliny we do not find any statement respecting the characters of the Rose which can be included within the limits of these remarks. Pliny himself states that no Roman author had written on flowers.

We now come to consider the modes of cultivating Roses practised by the ancients.

Of the Rosaria, Rose plantations, or places set apart for the cultivation of Rose trees, no account has reached us of the form or general arrangement of them. Those of Pæstum appear to have been the most remarkable, and were probably of great extent, judging from the large quantities of flowers they are supposed to have produced. Columella speaks of a place to be reserved for the cultivation of late Roses, as one of the appendages of a garden. From the account given by Pliny of his Tuscan Villa, we find the inner walks reserved for Roses, which were bordered with them. It is not improbable, considering the taste which the Romans had for this flower, that it was cultivated in all gardens of any pretensions, as in those for instance of Lucullus at Baiæ. Here it may be observed, though not immediately connected with the present subject, that in the time of Manilius, flowers were planted in the form of letters, and not improbably, like the box-hedges in the gardens of Pliny, expressed the name of the owner of the villa, or the planter who had the charge of the garden.

Pliny and Columella mention March and April to be the months during which Rosaries should be dug up, and otherwise prepared for the reception of Rose trees. Palladius reiterates this observation, and adds, that even in November they may be made in warm and sunny spots, and in localities near the sea-side.

Roses, according to Theophrastus and Pliny, were sometimes raised from seed, but the growth of the plant when thus propagated was very slow, in consequence, as they allege, of the seeds being situated within the bark of the tree and under the flower, and also from their having a woolly covering. Loudon remarks, that the seeds of the Rose require to be one year in the soil before they vegetate, thus confirming the statement made by Pliny, that "they grow very slowly from seed." From the remarks made by Theophrastus and Pliny, we may infer that the fruit or cynorrhodium of the Rose was planted entire, and that from the custom of raising Roses from seed several seedling varieties must have been obtained. The more favourable and generally employed method for propagating Roses was by cuttings or planting young shoots of Rose trees. The cuttings were to be four or more fingers in length, and were to be planted some time in April, and not to be removed until the following spring. When they were transplanted, the young trees were to be placed at the distance of a foot from each other, and were to be frequently dug round. They required a light soil; but it was to be neither rich or clayey, and was to be free from springs. Loudon remarks, that Rose trees require a rich soil, inclining to a clayey, rather than a sandy nature. Their favourite soil, Pliny remarks, was earth covered or mixed with the rubbish collected from old buildings.

According to Theophrastus, Rose trees were cut back, and were also burnt down, by which means the Rose trees were increased in size, and produced a larger number of flowers, and the flowers themselves were rendered more beautiful. The same writer also states, that when the Rose tree was frequently transplanted, it grew with greater rapidity, and the flower was improved in appearance.

The Rose tree cuttings and scions, observes Pliny, required to be planted deeper than young fruit trees, and not so deep as vines; the latter being sunk into the earth to the depth of 2 feet.

Pliny and Columella mention that it was usual to cover plants with *Lapis specularis* (talc) when it was an object to make them produce their fruits early, and to this Martial refers in one of his epigrams:—

On Bacchus' gifts lest envious Winter prey,
And blast the purple produce on the spray,
Beneath the crystal roof the vintage glows,
And screened, not hid, the happy cluster grows.—*Elphinston.*

From the same author we learn that a similar mode of proceeding was followed with respect to flowers:

So through the crystal are the Lilies told:
So does the gem the blushing Rose unfold.—*Ibid.*

From Pliny and Palladius we learn that warm water was used for forcing Roses, and Seneca, in one of his Epistles, reprehends the luxury of those who in winter seek for Roses, and the employment of warm water, and the adaptation of different temperatures for the purpose of producing spring flowers, and the Lily in the midst of frost.

This remark recals the observation made by *Biron*, in Shakspeare's play of "Love's Labour Lost."

Why should I joy in an abortive birth?
At Christmas I do no more desire a Rose,
Than wish a Snow in May's new fangl'd shows:
But like of each thing that in season grows.

The rarity of early Roses made them valuable, and, like all vegetable productions obtained out of their season, they were eagerly sought after, and as we learn from Martial bore a high price :—

> "The rare delights : we find first apples nice,
> And winter Roses bear a tenfold price."—*Elphinston.*

Pliny says that a small trench should be dug round the Rose trees, and that when the flower bud begins to sprout, then they should be watered with warm water. Palladius gives a very similar direction, adding however that the plant should be watered as above mentioned twice daily.

The following account of the cultivation of Rose trees is given by Didymus in the Geoponics :—If you wish, says he, to have a constant succession of Roses, plant fresh ones, and manure them every month. Roses, however, are planted in various ways ; some transplant them with the root entire ; others take them up with the root, and cut them down to the size of four fingers in length, and plant all that is cut off from the roots, and what grows from the trees at the distance of a foot and a half from each other. Some weave wreaths of Rose plants, and plant them for the sake of their fragrance ; but we ought to recollect that Roses will have more fragrance when grown in dry places, in the same manner as lilies have. Roses appear early both in baskets and in pots, and require the same attention as gourds and cucumbers. If you wish those Rose trees which are already planted to bear flowers early, a trench two palms in breadth from the plant must be dug round it, and warm water poured into it twice a day. Democritus says that if a Rose is thus watered twice every day in the middle of summer, it will bear flowers in the month of January. Florentinus remarks that a Rose may be grafted or budded into an apple tree, and that Rose blossoms will appear at the same period that apples do. If from a few plants more are required to be obtained, take cuttings of them four fingers or more in length, and set them in the ground. When they are a year old, they may be transplanted at the distance of a foot from one another, and they must be carefully dug around, and all rubbish must be removed from about them.

The Rosaries of Pæstum, to which we have above alluded, were probably, as has been noticed, of great extent, and it is interesting to know that the custom of rearing large plantations of Rose trees still exists in the East and in Persia, as appears from the following extract from Van Halen's account of his journey in that country :—" On the following morning," says this traveller, " we left our place of bivouack, in the vicinity of Kuba, with the rising sun, and proceeded through *picturesque fields covered with Rose trees.* The exquisite fragrance emitted by them, and which the morning dew rendered more fresh and grateful ; the varied warbling of a multitude of birds, who had their nests in these delightful bowers ; and the sight of several cascades, whose playful waters leaped from their steep summits, produced on every sense an indescribable feeling of delight. One of the nobles belonging to the suite of Ashan-khan made me a present of a small flagon of oil extracted from these Roses ; and which, when some months after I compared with the best Otto of Roses of Turkey, surpassed it in fragrance and delicacy. Beyond these *woods of Roses* spreads an extensive forest."

The celebrated plain of Roses, from the produce of which the well-known perfume above mentioned is obtained, is about three miles distant from the city of Damascus, and its entire area is thickly planted with Rose trees in the culture of which great care is taken.

We shall in the next place enumerate the localities which were celebrated for producing Roses.

FLORICULTURE.

By John Dickson.

The Dahlia.—I flatter myself that the few observations I am about to offer on the cultivation of the Dahlia or the King of Autumn, (as it is not unaptly designated) will be found acceptable both to those amateurs who have so far progressed with their collection of these lovely regal plants, as well as those who merely contemplate adding to their list of pleasures by undertaking the charge of these Children of the Sun. Amid the florist's care, few appear so grateful for his attention as the Dahlia; this may in some measure be accounted for on the principle that we really value blessings in proportion as they recede from us: consequently, I presume that when we see all our floral treasures departing from us, it is with a feeling little short of idolatry we welcome the expanding beauties of these glories of our autumn season. It may be, were our enjoyments more varied, as in the budding spring or blooming summer, the Dahlia would pass muster with the gorgeous assemblage, creating a feeling of admiration (it could not fail to elicit that), but falling infinitely short of the positive enthusiasm with which its coming is regarded in the Autumn, when it stands proudly alone in our grounds, seeming to challenge the floral world, for its pre-eminency in form, colour, variety, durability, and profuseness of bloom. I expect to be told that I am an enthusiast by some of my readers; by others, perhaps, that I arrogate too much to this class of flowers, its want of perfume being a decided drawback on its fascinations in many persons' idea. Let me respectfully suggest that *art* can still supply the scented flower for the greenhouse, conservatory or drawing-room; but *art* with all her boasted power (and its magnitude few are more inclined to admit than myself) could accomplish little to adorn the open grounds at the season when this flower is seen in all his glory, if *Nature* had not in munificent liberality granted us the Dahlia. It stands the test of our ever-varying climate, and it is not until stern Winter is heralded by frost and cutting winds, that the haughty beauty bends before the coming storm, and even then, in death as in life, the Dahlia maintains its proud position. Coming to us when all else had fled, it sheds the glories of life around us while mother Nature permits their feasting our senses in all their gorgeous development; but careful as she is that her pet children's charms shall never satiate, no sooner do they evince the slightest indication of decay and before their brilliant tints can fade, she brings in mercy a gentle frost and the proud King of Autumn sleeps upon her breast,—no mockery of dying, no partial resuscitation, throwing up blooms, a mere caricature of what they had been,—like some flowers I could name—but the first cutting wind sings their requiem and the hoar-frost constitutes a befitting pall for such obsequies, till phœnix-like they rise again from their bed of earth to charm anew the senses of their admirers; and surely their name is Legion.

For those amateurs about to commence the culture of the Dahlia, I would advise their selecting a spot of ground rather moist and light for flowers that produce hard or greenish centres, with a due regard to convenience for watering, as quick growth induces them to produce flowers with more perfect centres, such varieties as come then after their first blooms are thrown should be planted in an open situation and in heavy soil in order to secure slow growth.

Planting.—It is desirable that the ground selected for this purpose should have been thrown up in ridges during the winter, and levelled in dry weather about March or the commencement of April; seeing that it is well dug just previous to planting, proceed to marking the distance of your rows, which should be 6 feet from row to row, and from 5 to 6 feet according to circumstances in the rows; I think this will not be found too much, as it must be borne in mind that if the plants once become drawn, (which is the certain consequence of crowding them together) large flowers can never be produced, no matter what after care may be bestowed upon them. A small portion of rich compost well incorporated with the soil where the plants are about to be placed is desirable, as it induces the roots to take good hold, and they commence making their growth in less time than if planted without. A little rotten manure mixed underneath has been found of considerable benefit, both in my own practice and that of several very successful cultivators: the latter end of May or the beginning of June is the best time to commence planting; select for this purpose such as are rather short, thick, and inclined to swell—those that have stood too long in their pots, and are becoming stunted and hard, should be avoided if possible—but where collections are rather limited, and it becomes a matter of necessity that such should be brought into requisition, it would almost be wiser to repot them and place them in a brisk heat. I would here offer a suggestion for the consideration of all amateurs growing Dahlias; never omit to repot young plants as soon as received from the nurseryman; 4-inch pots are proper for this business, place them in a cold frame, keep them free (if you can) from all insect depredators and in a slowly growing state, giving all the air possible, weather permitting; when the plants assume a dark green colour and are short jointed, amateurs may calculate that their collections are progressing favourably. Fearing the injurious effects of delay, when the stakes are really wanted, I advise that a stake be inserted at once; secure the plant to it by means of a piece of bass not so tight but that plenty of room be given for the stem to swell, supply two smaller stakes at right angles to which also the plant should be attached, they will act as a preventive to mischief in bad weather, larger stakes must be added as the plant advances in growth; be sure to keep the side branches well secured or the first high wind will teach you a lesson not easily forgotten. *Experientia docet* is an old maxim, but I see no reason for paying too dear for even such indelible lessons as those afforded by the stern teacher alluded to. As a climax to my remarks on this part of my subject, let me impress on the minds of my readers the urgent necessity which exists for tying the branches of their plants out, and not under any circumstances together in a bunch; fine flowers can never be obtained by such means, sun and air are the life, I might almost say the very soul, of the Dahlia; size of bloom, consisting of brilliancy of colour, and in some measure durability of form, is dependent on their influence; to deprive the plant or any part of it, of such an extensively operative power, is to relinquish at once every hope of seeing a good flower.

Thinning.—I cannot lay down any definite rule on this head, but presuming a hint or two might be useful, I submit the following:—Never allow your plants to throw a number of small branches, and then use the knife mercilessly, removing them at once—this kind of sweeping operation is highly detrimental to floral life—it is much better to cut away any superfluous shoots as the plant progresses, and here some discrimination and knowledge of the subject to be operated upon must be brought into requisition—all varieties will not submit to the same amount of thinning—the large and coarse must be spared, while those that require increasing in size should be thinned. The constant inspection of these flowers in a growing state will soon supply all the information desired in the matter.

Disbudding.—The foregoing observations are applicable, or nearly so, to this part of the Dahlia culture. When you desire to reduce a flower in size, defer it to a later period; it induces a more compact flower, smaller petals, and generally improves the form.

Shading.—If I mistake not, more mischief is inflicted on the amateur by his own over anxiety in this respect than from any other cause. Idleness is said to be a great evil, and truly so; but the work an amateur gives himself in connection with shading his blooms, proves a much greater. It arises in many cases from beginning to shade long before it is requisite, which terminates in shading out of character many light varieties, and rendering all kinds tender, and less able to endure travelling to places of exhibition. Yellow Dahlias it is better to shade rather early, in order to produce them in clear and distinct condition, likewise some light varieties. While, on the other hand, such as have slight tips, or markings, should be postponed, or the chances are that the face of the bloom would be without its distinguishing characteristic. The time required to shade a bloom for exhibition is dependent on the weather. From three to five days would be sufficient for an early show, under ordinary circumstances, but as the season advances it would be found desirable to extend the time. Fancy has been busy in suggesting different kinds of shades for this business; their respective average of utility I have not space to enter upon, let it be sufficient for my purpose to mention such as have been proved to be most serviceable,—the tin shade painted white, the wire skeleton covered with white holland, and the inverted flower-pot, are among the best. The lattice is by no means desirable for general use. Flowers that appear weakly in their footstalks are best subject to this style of shading; but above all, I would caution my amateur readers from employing any contrivance that does not freely admit of a circulation of air. The grand desideratum with Dahlia growers is to keep their plants free from insects. The earwig is one of the most troublesome enemies. The most strenuous exertions can scarcely keep them from damaging and destroying, as they fly from plant to plant. As the best means, we advise early examination of the plants, using the most active vigilance in detecting their haunts,—many plans are adopted for this purpose. I believe there are few better than small pots half filled with dry moss, placed at the top of the stakes. Bean-stalks laid about them serve as traps, and oiled wool certainly prevents their gaining ready access to a flower. I recommend the ground round the plant being frequently stirred; let it be forked up about five or six weeks after the first planting. Keep everything in order, and as clear of litters as possible—decayed leaves, broken stakes, pieces of bars, and many other unmentionables, contribute to the great deterioration of their general appearance, while the growth of good flowers is rendered somewhat uncertain by such neglect.

Watering.—Plants that are continually watered will have the surface of the ground round them become baked and hard, it is therefore desirable to mulch them with partially decomposed manure; this should be attended to so soon as the ground has been forked over. It has a powerful influence in keeping the roots near the surface cool and moist. Soft water is the best to use, but when this is not to be had in sufficient quantities, take care to have the water you intend using exposed to the sun and air during twelve hours previous to watering with it. As the plants increase in size, they will require occasional deluging, rather than frequent watering—this must be subject, of course, to the weather. After the sun has ceased to shine over them, a watering over their head, through a fine rose, has a most invigorating effect, the dew which falls during the night keeping the plants in a cool, wet state, thereby enabling them to sustain the heat of the following day, without withering their foliage, the size and colour of which will soon testify to the policy of this part of their management. In selecting blooms for exhibition, let as much diversity of colour be introduced as possible; select quality before size.

In selecting plants for seeding, remove all inferior blooms as they appear, the fewer florets there are the greater the quantity of seed, with scarcely a chance of its producing a good double flower; much ultimate trouble will be saved by these precautions; the desirability of care in selecting seed is manifest, in the fact that amateurs produce finer flowers and more frequently, from their generally speaking small collections, than those parties who are known to have raised thousands of seedlings annually—so much for care on this important point. It may be as well to observe that those seedlings which take the lead and throw their blooms first, seldom, if indeed ever, produce a flower worth growing a second time: these are generally the offspring of the finest seed and thinnest blooms; they usually vegetate first, and maintain their priority during the season. They are easily to be recognised by their habit and absence of side branches, whereas the small plants that come late and almost require nursing to make them bloom before the frost sets in, generally produce the best flowers; very few of our best seedlings are shown the first season of their blooming, these are almost always raised from the smallest seeds and very double flowers. I think it advisable to change the soil where the Dahlia is grown, and not plant them year after year in the same spot unless the soil is partially changed; where this is the case, the flowers mostly degenerate as might be expected. It is further desirable that pot-plants should be invariably preserved of those varieties which raise badly from the ground, or a variety might be lost during the winter.

Having occupied the space allotted me, I have only to observe that in the next number of this Work I purpose offering a descriptive list of the best flowers out, in their respective classes, for the guidance of amateurs. Having no interest, directly or indirectly, in praising or censuring any grower's productions, beyond my earnest wish to see the best most cultivated, I flatter myself I shall stand acquitted of favouritism in the notice I have been preparing of these flowers. It is my constant aim to render justice to all—if it becomes necessary, in order to deter the inexperienced from being misled, to object to a flower—then honestly giving *my reasons* for such objection. I speak the truth, regardless of who may be the raiser, grower, or seller of it; such has ever been my unvarying practice, and such it will remain while I have the honour of appearing before the readers of the "Magazine of Gardening and Botany," as one of the servants of Flora.

ON THE CULTIVATION OF PLEROMA ELEGANS.

By G. T.

Respecting the management of this splendid native of the Organ Mountains of Brazil, to the rich velvety purple hue of whose blossoms Sir William Hooker has well observed, "no pencil can do justice," scarcely sufficient is known, as so few specimens are found in a good flowering condition.

From the time of its introduction to this country, in 1841, by Messrs. Veitch of Exeter, through the agency of their talented collector, Mr. W. Lobb, this beautiful exotic has been all but universally treated as an evergreen stove-plant. Nor should this circumstance surprise us much, when we come to reflect that *Pleroma elegans* is a Brazilian *Melastomad;* that of twenty-eight genera belonging to the Melastomaceous order, enumerated in "Sweet's Hortus Britannicus," twenty-seven are there recognised as inhabitants of the stove (all the species of the remaining genus, *Rhexia*, being hardy herbaceous perennials); and moreover, that of these twenty-seven genera again, upwards of a hundred species require the temperature of a stove to cultivate them with success.

Of the genus Melastoma itself, approximating so closely to Pleroma in some respects, that a species or two of the latter are by some botanists synonymised with the former; there is but one species of our acquaintance (*M. macrocarpa* or *M. malabathrica* of some botanists,) a purple flowering evergreen shrub, from China, that is occasionally met with under greenhouse culture, the rest being stove-plants; and yet there is a profuse blooming species invariably grown in stoves, that I have known to succeed admirably when planted in the open border of the flower garden, in summer, and requires no greater amount of heat than the cold greenhouse would supply in winter; and some such result, no doubt, which induced the experiment of planting in the open air a denizen of the hothouse, has at length taught us how to grow, and how, in profusion, to flower the splendid plant we are inviting greater attention to, and which, if we may presume to employ the expressive language of a learned professor, has been "coddled in the stove" until those who possess it can induce no quantity of florescence, and therefore become impatient with the encomiastic remarks which induced them, in the first instance, to purchase a plant.

What we shall presently relate of this elegant *Pleroma* it is probable may happen anon with the much-buffetted *Plumbago Larpentæ;* at least, now that the management of the former is beginning to be rightly understood, it should induce those who may have been hasty to condemn the latter to suspend their judgment yet awhile, and incite others to experimentalise, in order that its true requirements, and the "conditions essential to the most perfect cultivation" may be investigated and discovered.

Many, doubtless very many plants, that have long had for their dwelling-place the stifling, debilitating, and not improbably degenerating atmosphere of the "stove," a place exclusively in times gone by, and even now-and-then to be met with, for deciduous, evergreen, and bulbous rooted plants, annual, biennial, and perennial species assembled from climes where the influence of the sun is felt most potently, as well as from different zones of climate; doubtless, we repeat, very many such subjects as these, long "coddled in the stove," as yet displaying none, or but very little, of their native splendour, and existing rather as so many encumbrances there, will, in due time, like *Pleroma elegans*, either by accident or design, find their way out of it into situations, more consonant with their habits, more conducive to the development of their natural beauties, or, in short, more congenial to their healthiness and well-doing, under circumstances and conditions that, of necessity, will in a greater or less degree, surround their artificial cultivation in a variable climate like that of Britain.

As our remarks have mainly for their object the dissipation of the mistaken notion, which is very generally prevalent, respecting the subject of our present notice being a "shy blooming plant," even with the most special treatment that can be adopted, we shall best elucidate the discussion and make it more intelligible for practical ends by adverting, at the outset of our remarks, to the "conditions of cultivation" under which it is usually to be met with, and in so doing we shall endeavour to confine the observations we have to make to the extent of our own experience, which, during the current season especially, has not been on a limited scale.

From what has been noticed, then, *Pleroma elegans* is generally found growing in the stove, occasionally in the warm greenhouse, or structure intermediate in temperature with the greenhouse and stove, but rarely in the common greenhouse or cold pit; and in one instance only have we witnessed it fully exposed to atmospheric influence throughout the summer months: grown in the stove and subjected to the humid warmth accorded to the majority of Melastomads, Gesnerworts, exotic Ferns, &c, we find this naturally shrubby, hard-wooded plant, little better than some semi-frutescent species of the order *Melastomaceæ*, exuberantly caulescent and foliaceous in the most tender, debilitated form; the shoots superfluous in quantity, weak and sickly in condition, the leaves pale green and comparatively flaccid, and not the remotest appearance of inflorescence; the entire aspect of the plant, in short, having undergone by hothouse culture, a complete transformation from the sturdy habitude it should exhibit, to the debilitated appearance represented above. Nor is its character much improved from the above in the intermediate house, etiolation of growth being considerable, the habit straggling, and disposition to flower exceedingly circumscribed; a remarkable illustration of which has repeatedly come under our observation during the present year. A large specimen in one of the principal metropolitan nurseries, having been kept in a warm greenhouse all last winter and throughout the succeeding spring months until May, being subjected to the temperature requisite for the culture of Achimenes, Gloxinia, &c., partly shaded by climbers over-head, made a most exuberant growth, or rather growths, inasmuch as the energies of the plant had been in an increasing state of activity and excitement by root moisture, in addition to atmospheric humidity and warmth throughout the winter, and in spring the rampant shoots had been so frequently "stopped back," to obviate redundancy of growth and to preserve the specimen compact and bushy, that in May last, when we first saw the specimen, it was a dense, close grown, squat bush, composed of a mass of slender, rather long jointed shoots, tolerably firm, though very far from being sturdy, and the foliage of a dark green, but inferior in size, and not a flowerbud visible.

About this time the specimen in question, now a remarkably fine one, as far as dimensions, completeness of growth, and a superabundance of shoots would render it so, was transferred to a common greenhouse, with the view of maturing the growth by additional exposure to solar and atmospheric influences in order to induce it to blossom; but this object was not accomplished; it would not, nor has it yet borne a single flower, for being in such a highly excited condition by stopping the shoots, and what not, when removed from the vegetating influences of the warmer house, it had thus acquired a habitude of "growing" not easily to be divested of, and from the appearance of the plant a short time since, I strongly suspect it will not flower this season.

From the non-flowering condition of the particular specimen alluded to, a few useful lessons to guide the practical culturist in its management may be deduced, and attention may be directed to them with the more confidence, because their practical utility and value has already been attested in an instance we will presently refer to more particularly.

Firstly. Pleroma elegans should be treated as a *cold* greenhouse plant.

Secondly. A comparatively dormant state should be secured in the dead season by an exceedingly limited supply of moisture to the root, which conjoined with the low temperature of an airy greenhouse will ensure this desirable condition of rest, but at the same time, being an evergreen shrub, moisture must not be withheld so excessively as to induce the occurrence of foliaceous denudation.

Thirdly. The compost employed should consist of substantial loam and peat in about equal quantities, rendered porous and open by the presence of sand and the finer particles of drainage being commingled with it. Efficient bottom drainage should also be secured by a plentiful use of potsherds, broken bones, charcoal lumps, the coarser portions of turf, &c., and the above should not be enriched by manure in the solid form, or decomposed vegetable substances of an over-stimulating kind.

Fourthly. When commencing growth in spring the sunniest and most airy situation the greenhouse can afford should be allotted it, even close to the glass if possible, until the middle of May, moisture being still cautiously administered to the roots, but supplied copiously, and occasionally syringed over head as the growth becomes vigorous.

Fifthly. During growth, only the most rampant shoots should be "stopped" to preserve uniformity by throwing additional vigour into the weaker ones, but a gradual disbudding and thinning of the shoots whilst young should be accomplished, in order that the specimen may not be redundant of "wood," and that the remaining shoots may experience every available assistance by additional exposure to the maturing influences of light and air.

Sixthly. As the annual growth approaches completion, syringing should be no longer performed, water given cautiously and not so copiously as hitherto at the root, although the real condition of drought must not of course be permitted. The specimen should now be transferred from the greenhouse to an aspect in the open air where every atmospheric influence, apart from *wet*, can be ensured.

It matters not how intense the sunlight may happen to be, the shoots must be ripened or they will not flower, and, although it would be advisable, nay indispensable, to plunge to the pot-rim in coal-ashes or sand, or to enclose the pot in another pot or tub having an intervening layer of moss or sand betwixt them to shield the soil from desiccation, and the roots themselves from the evil effects arising from an undue amount of dryness in the soil, no apprehension need be entertained as to the amount of solar influence the *wood* should experience: it may be literally "roasted" by the sun and yet will take no harm, but rather this "roasting" process is an indispensable preliminary to proliferousness of inflorescence, so long as the soil is accorded a reasonable quantum of moisture to obviate desiccation, but no more than is requisite to accomplish the latter object; as if water during the maturation of the wood and formation of the bloom-buds be given with too liberal a hand, the consequences may be that a secondary growth may occur, instead of the plant unfolding its splendid flowers.

It is true that the foliage will become somewhat brown or assume a reddish tinge by this full exposure, robbing the leaves of their rich green colour, but this circumstance will not happen to any considerable extent if previously well exposed in the greenhouse and thoroughly inured to atmospheric influence before leaving it to the effects of the open air. But, however this may happen to be, exposure is indispensable to the obtainment of flowers, and there are few who would not willingly forego some detraction from the loveliness of the specimen when atoned for by a glimpse of the peculiar richness of this plant's floral hues; and doubtless when the buds are formed, and when, in order to obtain a long continuance of the expanded blossoms, the specimen is replaced in a greenhouse or structure of any kind for affording necessary protection from the weather, a slight shading for a few days only would quickly restore much of the verdure that has been lost, and the leaves have time sufficient to regain their wonted rich green tints, before the expansion of the flowers occurs, and thus the beauty of the specimen be enhanced, by the contrasted charms of glossy green and the richest violet-purple.

Should, however, as unfortunately does too often happen in the British Isles, a rainy summer obtain, the subject under discussion must not of course be removed to the open air, as above recommended, but in that case "hardened off" as well as can be done, by close proximity to the glass, so that every fitful ray of solar influence may be appropriated in the greenhouse or cold pit in conjunction with the utmost freedom of aëration under existing circumstances.

In common with the generality of *Melastomads*, the present species of *Pleroma* is a vigorous grower, requiring an extensive rooting medium, and must, therefore, be duly supplied with a pot of considerable dimensions, if large and handsome specimens are a desideratum; and although, as may be inferred from the allusions already made to the watering part of the subject, the exercise of no inconsiderable amount of practical skilfulness is requisite in the appliance of fluid auxiliaries with success, and in accordance with the object in view, it must be well borne in mind that the root supply of fluid when the plant is in a vigorous growing state must be copious and unrestricted, and moreover, occasional applications of *well-diluted* liquid manure, when once the flower-buds are apparent, will be found highly beneficial to the specimen and its crop of flowers; for while a considerable enhancement of ultimate vigour will certainly ensue from a little extra stimulation of a period when the energies of vegetation are most severely taxed, the inflorescence, so far from one iota of its splendour being detracted from, will derive greater intensity of colouring, as well as amplification, in consequence.

By the foregoing remarks, then, it will readily be perceived that the method of high temperature ordinarily adopted in the cultivation of *Pleroma elegans*, is far from being appropriate; and from what has also been advanced in reference to the usual course of stove culture, and recommendations, which on its first introduction to the notice of cultivators indicated its suitableness for the stove, and the stove for it, it will be also seen with equal clearness that from the limited knowledge and experience which those who introduced it, as well as those who cultivated it at that time, had of its real habits and requirements, "everybody" thought it was a stove-plant and therefore like the majority of its congeners very reasonably treated it as one.

In consonance with the principles and practical directions for the successful culture of this fine exotic, which the preceding observations embody, a specimen (which has attained the ultimatum of perfection, as far as we have yet met with a "specimen" of it), was a short time since brought to our notice in Messrs. Rollisson's Nursery at Tooting,* composing a dense, compactly grown, dwarf, well-managed bush, nearly a yard in diameter, and about 2 feet high; the shoots sturdy, short-jointed, hard, and of a healthy brown colour, profusely clad with good foliage, and no less a number than *four hundred* equally healthy, prominent flower-buds, some of which were about to unfold; and from what we have seen elsewhere, we believe this to be an unrivalled "specimen of the most perfect cultivation," which had evidently been in subjection to the conditions most essential to the attainment of so great a desideratum, and indeed we were apprised that such was the case.

Hitherto we have not seen this plant at any of the exhibitions, which is doubtless to be accounted for from the circumstance of its not coming into flower, even in the hands of the few who *know* how to flower it, until too late for being produced; but the absence of so great an ornament is really to be deplored, and we trust the skilful "plant-growers," around the metropolis especially, will turn their attention to so fine a plant.

Perhaps a gentle excitement in early spring in a very moderately warm pit, until the shoots are an inch or two in length, and after-removal to a colder structure, would go far towards the accomplishment of this object, which we think would be more likely to be attended with successful results by the possession of a reserve of specimens, to be alternately divested of a large proportion of the inflorescence, and every facility put in requisition to ensure the early ripening process of the wood in the season preceding the exhibition the specimen is to be produced at: or if cultivators themselves are enabled to attain the object in view, without this sacrifice and the bestowal of extra trouble, by all means let them do so; the writer of these directions does not presume to more, they at most are but suggestions, and merely adduced as a few general hints to be improved upon, and turned to practical account by those who best know how, when, and where to employ and apply them.

While the remarks that have been made, however, are intended to exhibit what I trust will, in practice, be found to comprise the essential elements of good cultivation in reference to the production of compact bushy specimens, alike suitable for the greenhouse, stage, and exhibition tent, I do not intend *Pleroma elegans* to be deemed unsusceptible of being cultivated into a shrubby bush, less formal in its external aspect under suitable conditions.

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* Since writing this article we understand the fine specimen alluded to has been forwarded to the Continent.

Like many neglected plants we meet with now and then, it will assuredly become an unsightly object when allowed to grow at random, if a judicious system of pruning and keeping it in bounds is not timely resorted to; but nevertheless, this circumstance does not disqualify it from reaching the height of 6 or 8 feet, and branching uniformly from base to apex, so far from this we more than suspect that this Pleroma may be grown to a large sized, handsome specimen, formed pyramidically or otherwise, of free flowering habit, and indeed altogether, of a very ornate character, produced by appropriate pruning, thinning and directing of the main branches when disposed in the border, on the sunniest aspect of a cool conservatory; a supposition we are fully borne out in by the appearance of a specimen 6 feet high or more, and blooming freely, which recently came under our notice in a small orange-conservatory in the garden of S. Rucker, Esq., Wandsworth.

TREATMENT OF PLANTS INTENDED FOR WINTER AND SPRING FORCING FOR THEIR FLOWERS.

By G. T.

(Continued from p. 242.)

At the commencement of August preparation must be made for potting them in a compost similar to that in which they have been growing; with the addition to it of plenty of coarse portions of well decomposed turfy loam and vegetable matter.

A single potsherd and plenty of moss in a fresh state will make the best of drainage, as into the latter, when becoming somewhat decomposed by the action of water passing through the pots, the plants will freely root. Whilst the employment of good roomy pots will be necessary on the one hand, (as obviating the necessity of reducing the balls of the plants no more than can be avoided in the process of taking them up), there can exist no objection to their employment on any other score, being mainly intended (and chiefly employed when in flower) to fill up vacant spaces and occupy the most prominent positions in large greenhouses or conservatories, the decoration of corridors, entrance halls, &c., in conjunction with forced specimens of Rhododendrons and other hardy shrubs. The beginning of August is oftentimes very hot and dry; it will therefore be necessary to remove the plants when potted into the north side of a cold pit, where they must receive a good watering, and be kept tolerably close, with an occasional syringing for three or four days as many times a day; by which time they will have recovered from the check unavoidable under the best of circumstances in transferring plants in the midst of vigour, from the open ground to the confined medium of a pot.

Gradually inure them to the open air again, and after the lapse of ten days or a fortnight, they will be fit to transfer to the open ground, where they must be plunged in coal-ashes, &c., as hinted for shrubs. In this situation due attention must be paid to the routine of watering, stopping; and the removal of flowers, &c., must again be persevered in; and if the remainder of the season continues fine and dry, the plants will derive the greatest benefit and assistance in the maturity of their summer growth, from the check experienced in being repotted, combined with freedom of exposure afterwards. In consequence of their comparative hardiness, a nocturnal frost or two in September need not create alarm for their safety; although it will be advisable to remove them to the temporary protection of a cold-pit towards the end of that month when the "Ice King" has sometimes made havoc amongst half-hardy plants left unsheltered in the open air.

When placed in the pit, they must again be plunged to the pot-rims, receiving but little moisture, being rather allowed all the repose, short of actually suffering from dryness at the root, and plenty of air in favourable weather throughout the rest of the autumn and ensuing winter, until wanted for forcing in succession, in conjunction with hardy shrubs.

Pelargoniums, Verbenas, and Heliotropiums, are bad plants (from the stringy nature of their roots when grown vigorously) to " lift " with good " balls " when planted out; they must therefore be cultivated in good roomy pots throughout the season, precisely under the same conditions and treatment as above recommended for other half-hardy plants; bearing in mind, however, that Pelargoniums intended for forcing cannot be propagated too early, too rigorously be subjected to the " stopping " process, nor lie exposed to too much sun and air in the maturation of their wood when plunged in the beds of the reserve-garden; and the compost they are grown in should be exclusively loam and a good deal of sandy peat, with plenty of charcoal lumps and potsherds, about the size of marbles, extensively commingled. Such a treatment we have known render Pelargoniums what they ought to be for forcing; namely, as dwarf, hardy, and stocky as a worn-out besom, with the foliage free from the " spot " disease, and correspondingly rigid.

In addition to the foregoing general directions for the preparation of plants for forcing, a few special ones are necessary, as being applicable in particular cases. Hyacinths, and most Dutch bulbs, for instance, if required, as they sometimes are, for exciting very early, must be planted in their blooming pots directly they are imported—in August, if they can be got—and plunged in sawdust or coal-ashes, beyond the influence of light, and well-protected both from excess of cold and moisture, until required for use; but by no means should bulbous-rooted plants be introduced into the forcing-house until such time as the pots are full of roots, and the bulb found " starting " into growth.

Half the failure which occurs in the forcing of Dutch bulbs, arises from the circumstance of their not being planted long enough to establish themselves sufficiently by filling the pots full of roots, before being placed in heat. Notwithstanding, this circumstance cannot at all times be controlled, in consequence of the annual importations from the Continent not regularly taking place so early in the season as desirable.

Many annuals and biennials too, although they will scarcely bear " forcing," are well adapted for assisting in the winter gaiety of the greenhouse and conservatory, and affording cut-flowers for the drawing-room; the suitableness and attractive fragrance, for example, of Mignonette, Ten-week Stocks, and Double Wall-flowers, when made to flower in winter, are too well known and appreciated to require eulogising.

For this purpose, they must be sown thinly, the last week in July or beginning of August, in pots or pans kept closely in a frame until germinated, when they must be thinned out to four or five plants in a pot, receive little water but plenty of air, and be occasionally topped or pinched back (not too much so) to render them dwarf, permitting no flowers until placed in their winter quarters, the greenhouse or warm conservatory. There is nothing more attractive than nice Double Stocks and Wall-flowers, when they flower well in winter and early spring; the former should be sown with other annuals in July or August, the latter in April, and both should be sown on a slight or exhausted hotbed, and will make nicer plants if potted singly in a rich compost of mellow loam and rotten manure when about three inches high.

Another plan for raising annuals for winter flowering is, to sow in an open sunny border in the middle of July, and then transplant into pots; but although this may suit some kinds very well, it will be found that the generality of hardy and half-hardy annuals and biennials will succeed better by sowing in the pots or pans where they are to remain, and more especially if the semination be made rather deep in them, so as ultimately to admit, when about half-grown, of adding some fresh compost, which will additionally support and stimulate them.

Pinks and Carnations for forcing must be propagated on a hotbed, as early as pipings are procurable, and planted out when rooted in a rich border, where they must not experience any drought, but be encouraged with weak liquid manure until September, when they must be taken up with good balls carefully preserved entire, potted, in a compost the principal ingredients of which must be stiffish loam and very rotten cowdung, and plunged with other plants intended to be forced. The previous season's pipings and layers, however, will be stronger and better for this purpose, if planted on a north aspect, in nothing but peat and loam, thwarting every attempt to blossom, and potting them early in September with good balls in a richer compost than that they have just been taken from.

Such plants as Cinerarias, Callas, &c., which grow herbaceously, should be planted out in rough peat, a good distance asunder, on the north border of the reserve-garden, the last week in May. They must be encouraged well with liquid manure occasionally, prevented flowering at all, taken up with good balls, divided, and the strongest plants potted singly, the weaker ones several in a pot, in September, in a substantial rich compost of loam, peat, leaf-mould and sand, with plenty of open drainage, and plunged with other things in the cold reserve-pit until wanted for forcing, or, what is better, placing them in their flowering situations without being forced at all beyond in the atmosphere of the greenhouse or conservatory.

Various herbaceous perennials, as has been before observed, succeed very well, if lifted from the open ground with good balls, potted and placed at once in heat. They must not be permitted to flower, however, the season previous, and will make better plants if taken up and potted in September, having their flower stems thinned out to half-a-dozen or so, when they commence to grow: and such fragrant kinds as Lily of the Valley, the Sweet-scented Colt's-foot, &c., should not only have their flowering prevented and foliage thinned out, but should receive abundant liquid manure-waterings also, in showery weather, to invigorate the roots throughout the season antecedent to their being in requisition.

Finally, the beauty and utility of Primula sinensis, the fringe kinds especially, are well known, and the plants being universal favourites, they are indispensable for winter decoration. Although the Chinese Primrose will last two seasons (if division of the root-collar, and recultivation after having flowered one season, is resorted to), they best succeed when treated as a frame or greenhouse annual. Let them be thinly sown in March, in rather sandy soil, on a slight bottom heat, and when two or three rough leaves are developed, pot them singly in small pots and light rich soil, and grow them on a north aspect in a cool pit or frame, free ventilation being afforded night and day. They require a dry rich compost, containing plenty of decomposed cowdung and a little sharp sand, and in hot weather delight in moisture, though not an excess of it. In June, either shift them into their flowering pots at once, or turn them out on a shady border in the reserve department into a good, though rather stiff compost, that they may "lift" the better, and grow steadier. In either case, secure drainage and a rougher compost must be employed in their final re-potting, and this performed, they should be plunged, wide asunder, in coal ashes, in a free, airy exposure, and neither over watered, nor allowed to become at all dry; a medium condition being maintained, or they will either become too luxuriant to bloom at all, or have their flowering period premature; both of which extremes must be guarded against. Here they may remain until October, when they should be introduced into any appropriate situation in which they are wanted to bloom, but they must not experience a higher temperature than that of the greenhouse, conservatory, or sitting-room, for which latter situation (inasmuch as they delight in partial shade) the Chinese Primrose is admirably adapted.

The Chrysanthemum, too, although scarcely to be reckoned a plant for "forcing," is one of our most attractive genera for making gay the flower-garden and conservatory, at a time when the brighter hues of summer have vanished beneath the chilly breath of autumn. In a general way, this useful autumn plant is propagated as early as cuttings or suckers can be obtained from the old plants, and grown in large pots, kept plunged throughout the summer in the reserve-garden: but the neatest and prettiest specimens are to be got by turning out the old plants in April in rich soil, and thinning out the shoots to three or four upon each plant. They should be made to recline upon the ground when planted, so that the principal stems, when grown to about the length of eighteen inches, and have formed flowers, may be layered. The layers will soon root and become very dwarf, compact plants, full of flower buds by the middle of October, when they must be taken up with good balls, and potted in rich soil, and placed in a cold pit for a week or two, when they may be removed at once to their blooming situations.

The two main points to be attended to in their cultivation are to obtain strong, bushy plants (by supplying food in the liquid rather than in the solid form, and pinching back the shoots) as early in autumn as possible. They enjoy a free compost of sand, loam, and rotten manure, well incorporated, and, being thirsty plants, must at all times, especially when the flowers are about expanding, be freely supplied with water or weak liquid manure. And although severe stopping and thinning of the young wood early in their season of growth is indispensable, the process must not be repeated after the formation of flowers (beyond thinning out the buds individually, if very fine flowers are a desideratum), or the season's bloom will be altogether lost.

The fields and river-banks of Britain teem with many an indigenous flower, whose beauty and fragrance could vie, if subjected to cultivation, with many a rare exotic. *Myosotis palustris,* the marsh Forget-me-not, for example, is ever a charming plant (alike from the associations inseparable from its name, and the intrinsic modest beauty of its flowers), and will bear forcing capitally, if grown in spongy soil, and is in turn denuded of all its summer inflorescence.

Note.—In the removal of undeveloped flowers from plants the season before, *i. e.* the summer previous to forcing in the ensuing winter, such plants as the Rhododendron, of course, are not included.

ON BEAUTY OF LINES IN GARDENING.

By Mr. Kemp, the Park, Birkenhead.

Trivial as such a subject may appear at first sight, or to the unobservant, it nevertheless lies at the very foundation of all ornamental gardening, and includes every species of object that can adorn or disfigure a landscape. To the mind unpractised in analysing the effects which are presented to it, combination, colour, variety, and many other things, may seem to produce the good or bad impression which an object or a scene excites; but the more prying examiner will not fail to have discovered that *form*, figure, or, as expressed in the heading, "lines," play a far more important part in the production of both pleasure and annoyance, whether in a garden view, or a more general prospect.

Hence, in the fashions which, as in almost every other art, have at different times swayed the lovers of gardening, the adoption of one particular kind of line, or the blending of two kinds, has been the real and principal basis of such changes. Scarcely more than a century ago, little was known or seen of any other description of line in gardening than the straight line. This was the governing rule in the formation of all roads, walks, plantations, flower-beds, &c. And even plants themselves were cut into hedges or other regular shapes in gardens, and seldom left to assume their proper character.

After this period, and as a somewhat natural revulsion, the serpentine line, which the genius of Hogarth had fastened upon as the source of all beauty, came rapidly into vogue; and so violent was the re-action, that many of the noble creations of former ages, in which the straight line prevailed, were unsparingly swept away. To this last rage, however, as to the first, but all the more speedily in correspondence with the greater recent progression of everything relating to taste, there followed in due time a pause; and since the beginning of the present century a happy mixture of straight and curved lines, or the adoption of either according to the peculiar circumstances of the case, has been the recognised rule.

Perhaps it ought here to be mentioned, that intermediately between the advocates of the straight and the curved line, although subsequently to the latter in point of date, there sprang up a school, the admirers of what is termed "the Picturesque," in which broken or irregular lines are the leading features. But such lines are hardly applicable, except to rough ground, or water, or vegetation in general; not being adapted to roads, walks, and dressed ground, save to a very limited extent.

In respect to the two great distinctions in the character of lines, there are even yet many who entertain and propound the strongest prejudices, almost or altogether repudiating the use of anything like a straight line, and regarding an angle (especially a right angle) in a walk, or a bed, or a clump, as an unpardonable sin against good taste. This is fully as unreasonable as if an architect, considering straight lines to be the basis of all architecture, and the necessarily prevailing characteristic of its forms, were to abjure and denounce all manner of curves; though it is well known that crescents, circular temples, domes, semicircular porches, arches, and other curved figures, are universally esteemed some of the most beautiful features of the art.

Much having been said in former papers respecting the arrangement of trees and shrubs with regard to their outlines, attention will mainly be directed, at the present time, to those *ground* lines by which walks, roads, flower-beds, &c., are defined, and such as mark the surface of the earth in gardens or home estates. An attempt will therefore be made to point out the principal situations in which the formal, or the serpentine, or the picturesque line may be most fitly used.

Every one will acknowledge that if straight lines are admissible anywhere, they are so in connection with a house, or some other great architectural feature. In the neighbourhood of some styles of houses, indeed, especially if they are large, and still more so if they merit the title of palaces, straight walks, and regular figures in the flower-beds, are almost indispensable. Such are the Grecian, the Roman, and the Italian styles of architecture, with their modifications. Other kinds of houses, too, in which any one of several forms of Gothic architecture is employed, and which are accompanied with a terrace or terraces, necessarily demand straight walks. In fact, all houses which have a principal walk in their front, and parallel with them, or passing off from their centre at right angles, or from which the garden walks are made a very prominent feature, require those walks to be straight, or such as are parallel with the house may follow the lines of the house.

But straight walks cannot be carried over an uneven or undulated surface, and consequently, wherever they are introduced, if the ground is not flat in itself, or has not a regular slope, it must be artificially brought into one or other of such states. Right lines in walks are incompatible with any but smooth and flat surface lines. Nor are slopes or inclinations at all allowable where straight walks are employed, unless they rise or descend from the house at right angles with it. All cross slopes, or such as are parallel with the house, are decidedly objectionable in relation to straight walks. And where the level in this style of gardening has to be materially changed, it should be done by means of a terrace bank and flight of steps, which should be precisely parallel with one or the other of the sides of the house.

Where the system of straight lines is chosen as the style of a place, or any part of it, the walks ought all to pass off from each other at right angles, or so nearly at right angles that the difference will not be perceived. Sometimes, in the very ancient style of gardening, a walk traversing a large square plot diagonally may be permitted, when another walk entirely surrounds it; but such walks very rarely have a good appearance, and cannot be adopted in relation to modern buildings. Indeed, any straight walk passing off obliquely from another straight walk (except in the instance just named) destroys the congruity of the plan, and is as objectionable as an oblique line would be on one of the principal sides of a building. The union of curved lines with straight ones in walks is not to be decried, if the preceding rule be observed.

A straight avenue, as an approach to a house, is often a magnificent object, when the style of the building and the shape of the ground are suitable. The latter consideration is, perhaps, the more important of the two. If the house be on higher ground than the entrance gate, and the intermediate space be not undulated, an avenue will always be effective. But to pass *down* an avenue to the house, or over any swells or undulations, could not well be tolerated. The house or other object to which an avenue leads should always be seen throughout its entire length. An avenue, which is not terminated by something which indicates its intention, is justly liable to the ridicule which has generally been thrown on "walks that lead to nothing." The same remark applies likewise to all straight walks, which should be ended by some vase, or statue, or summer-house, where practicable, or by a plant or group of plants. In point of convenience, the straight avenue must be judged entirely by the nature of the locality in which it is applied.

What has been affirmed respecting the fitness of straight lines in the vicinity of houses, may also be extended to other buildings, such as temples, conservatories, ranges of plant-houses, &c., where a decidedly architectural character is attained, or any great dimensions or length realised. In kitchen-gardens, too, where the shape is anything resembling a square or parallelogram, straight walks are always to be preferred for convenience, and because they cut up the ground less.

When the walks of a place are mainly in straight lines, the flower-beds or masses of shrubs, or single plants near the house, should so far correspond as to be in lines and regular shapes, as much as possible. Not that angular figures need be employed exclusively. Circles, ovals, crescents, or any curved shape in flower-gardens, if it has its correspondent shape in the opposite part, will not only be proper, but may often be most desirable. Indeed, wherever, as a rule, the choice lies between an angular figure and one of which the outline presents any part of a circle, the latter is always best, provided it does not produce too much sameness. A row of circular beds, or circles for specimen plants, on each side of a straight walk, is therefore far preferable to a similar row of square or oblong ones.

Straight lines, then, are adapted to the walks or the beds of a flower-garden, immediately around a house or other extensive building, and to ground that is either flat or capable of being made so, or which can be divided easily into terraces. Curved lines, on the other hand, are suited to every other kind of situation, and specially recommend themselves where the surface of the ground is irregular and undulated, where the space is circumscribed, where the walks are wished to be concealed from the house, and where greater variety and naturalness are sought. By means of these, in short, a place may be made to appear very much larger than it is; a far greater diversity of view, both of the place itself, and of the outlying district, may be obtained; more privacy and shade can be secured; and the positive beauty of all the lines will be decidedly superior.

Considered in itself, few will dispute the position that a curved line is more really beautiful than a straight one. Barely a single object in nature that men generally account beautiful, could be pointed out, the form of which is not defined by more or less undulating lines. This justifies, and well nigh necessitates, the use of such lines in works of art, especially when such works are meant to resemble nature, and are composed of nature's own materials. But though a distinct and well-marked wavy outline be found in the most beautiful animals and smaller natural things, such is not the case in respect to the higher of the vegetable forms. In single specimens and natural groups of these, while some degree of symmetry and clearly defined waviness is often preserved, yet no simple curved line could ever mark their exterior. Hence, in the treatment of groups of plants on lawns, or elsewhere, the shape of the dug ground should at first be neatly delineated, but in very irregular and varied curves; so that, when the plants cover it, and the sharp outline is destroyed, (as it always should be, unless where flowers are cultivated along the front of the mass,) the broken character of a natural clump, with its bold juttings and deep indentations, or softer swells and gracefully retiring sweeps, may be fully attained. And this is one of the modes in which picturesqueness can be introduced into gardens.

In walks composed of curved or serpentine lines, the different sweeps should be varied, as much as the space will admit, in boldness and length, and they should either have or seem to have some natural obstacle opposing and preventing a straighter course. A swell in the ground, a group of trees or shrubs, a small erection, or an irregular mass of rock or stones, partially covered with trailing plants or low evergreens, will in general accomplish the needful obstruction. Whichever of these, or whatever else, may be selected, if the next curve in the walk takes an opposite direction, and thus becomes liable to be seen from the present one, this must be carefully prevented by some evergreens, or other means, which will do it effectually at all seasons of the year. One of the greatest deformities of a serpentine walk is the being able to see two or more of its curves at the same time. Considerable boldness in the sweeps is the best remedy for such a defect. It is by no means requisite or desirable that a serpentine walk should have its curves set out to a regular radius. Provided they are easy, and please the eye, and are well adapted to the ground, and merge softly into each other, the less artificial they are the better. The windings of a river, as seen from a lofty hill, or a partially frequented and inartificial cart or foot-track across a waste, or through a forest, where there are many natural obstructions, will often afford a good study for both walks and drives. And all that has here been written with reference to walks, alike holds good in regard to drives; only the curves in the latter should of course be still longer and freer.

Wherever, from the tameness of a locality, or the wish to hide unseemly objects, or the desire to obtain more shelter, or the possession, from any source, of a quantity of surplus soil, it becomes necessary to form artificial undulations or mounds, or to deepen or raise the hollows and swells actually existing, scope is always thus afforded for the development of the beautiful in lines. A few observations on this subject, drawn from a close notice of the manner in which nature generally varies the surface of the earth in districts where either knolls, hills, or mountains are very abundant and diversified, may not be misplaced. Where the greatest beauty of lines prevails, there is considerable irregularity of height and breadth, with arms jutting forward here and there, at varied intervals, and of different lengths. All the undulations are essentially gentle and easy. The broadest parts, and those which stand most forward, are the highest, and the narrow parts consequently lowest. The base is generally carried out till it gradually passes into the level land, and invariably by a concave curve. In the narrower and lower parts, this curve is all the more concave, so as to partake more of the shape of a large expanded spoon.

It is obvious that, in making artificial mounds or hollows, on however small a scale, the more faithfully these characteristics are copied, with a due allowance for the contracted dimensions, the greater will be the beauty of line realised. And in raising the ground for plantations, or for single plants on lawns, the above rule as to lengthening out the base till it blends softly with the general level, and making the sloping edge concave, instead of flat or convex, will do more towards improving the beauty of a lawn, and giving boldness and character to the outline of the plantations and groups upon it, than almost any other thing that could be done to it. As a final rule, where the face of artificial mounds is to be partially clothed with turf, and partly planted, the grass should ascend much higher up the hollows and low parts, creeping even over the upper edge in some places, and the plants be brought lower down and forwarder on all the principal swells, a taller description of plant being also chosen for such prominent parts. Such an arrangement would tend much to the production of variety and beauty of outline.

The theme is a fertile one, and has been but scantily investigated. It must now, however, be dismissed with a few words on the beauty of lines in those architectural objects which are fitted for garden decoration. If such forms are sufficiently removed from the house not to compose a part of it, the propriety of using right lines and angles generally in them, admits of grave question. And whether, commonly, such things as *circular* temples, summer houses, stone basins for water, and conservatories; with columnar pedestals for vases and statuary, bridges or viaducts; in which arches are most prominent; curvilinear, domical, or conical roofs for conservatories; and a more free general introduction of curved lines, would not be better accordant with garden scenery, it may be worth while diligently to inquire. The writer recently noticed, in the neighbourhood of Chester, a very elegant little *bell-shaped* garden tent, which he could not but regard as a feeling after the beautiful in such matters, highly worthy of imitation.

THE LOTE OR LOTOS OF THE ANCIENTS.

By the name of Lotos, several plants whose habits are very dissimilar, were known to the ancients, and are also acknowledged by modern writers. The Lotos of Egypt, for instance, so often mentioned in ancient writings, and which was carved in the Egyptian temples and on Obelisks, and held by them in such sacred veneration, was without doubt some species of water lily.

It is not, however, quite clear that the name was confined to one species only of water-plant, but rather the contrary; for if we may credit the writings of Herodotus and Theophrastus, besides the generally acknowledged species (*Nymphæa Lotus*), the Nelumbo (*Nelumbium speciosum*) was also called by that name, and was in their day a common plant in Egypt, being generally supposed to be a native. The descriptions of these authors are also so clear and minute, that no room is left for doubt as to the Nelumbo being the plant to which the above authors allude; and these accounts of theirs are in a great measure confirmed by ancient Egyptian sculptures and mosaics, which are still in a state of preservation. No traces of this plant, however, in an indigenous form are to be met with in that country in the present day, and it would seem not improbable that the plant was only a partially naturalised introduction, and was never found in a truly wild state.

The *Nelumbium speciosum*, as is well known, is a native of the East Indies, and although it might at one time have been abundant in Egypt, was probably afterwards lost. The roots and seeds were supposed to form the ancient preparation called "*Colocasia*," but Dr. Patrick Browne is of opinion that the products of two very different plants were confounded under the above name, namely, the seeds of *Nelumbium speciosum*, and the roots of *Caladium Colocasia*. The seeds of the former are about the size of, and possess something of the flavour of almonds. The ancient Romans are said to have made repeated efforts to raise this plant, and cultivate it in Italy; but were always unsuccessful, although they introduced the seeds from Egypt.

Besides the Nelumbo, another water-plant (a real native of Egypt) was long held sacred to superstitious veneration in that country, being dedicated to Isis: this also was named Lotos, which appellation some have supposed to have been adopted in consequence of the ill success which attended the naturalisation and spread of the East Indian kind (*Nelumbium*); and from the great resemblance which exists betwixt the two, both in habit and appearance, this kind is called

NYMPHÆA LOTUS, *Lin.*, and is identical with the Castalia mystica of Sal. Ann. Bot. ii. p. 73. It is not unlikely that this plant and not the Nelumbo was the original sacred Lotos of the Ancients. Some of the ancient Roman writers, however, were of opinion that the Mythology of Egypt migrated with the introduction of the Nelumbo from India, and that thereupon the Nelumbo was the original sacred plant, but this not succeeding well, the Nymphæa, an indigenous plant, was cultivated as a substitute. Be this as it may, the Nymphæa Lotus is universally acknowledged in the present day as the true Egyptian Lotos. The *roots* are tuberous and eatable. The *flowers* are large and white. The *sepals* are all tinted with red at the margin. The *seeds* were dried and ground, as were also the tuberous roots, and were by the ancients made into a kind of bread. The *flowers* sink every evening languidly upon or beneath the water, which peculiarity was taken notice of by the writers of early days. The *leaves* are peltate; sharply serrated; under surface pilose at the nerves, and pubescent between them. It is a stove aquatic, and is at the present day abundant in Egypt, growing in slow running streams, especially in the Nile near Rosetta and Damietta, and in rice fields during the time they are under water. The plant was introduced to this country in 1802, and is of easy cultivation. There is little doubt but this plant is also alluded to in the sacred writings, especially in Hosea xiv. 5, where the translators have rendered the Hebrew word "Lily" instead of Lotos; and again in Isaiah xix. 6, where the same word is again rendered "flags" instead of Lotos.

The Lotos (Λωτος) of Homer and Dioscorides, the former of whom is supposed to have written about 900, and the latter about 300 years, before the Christian Era, is quite a different plant from the Egyptian Lotus, being evidently a leguminaceous one. Modern botanists, by comparing the descriptions of those authors with plants growing in the localities mentioned in their writings, have come to the conclusion that the Lotus of these writers was one of the Birds-foot Trefoils, and have in consequence named it *Lotus Dioscorides* in our Botanical Catalogues.

The *plant* is a hardy annual with branched, erect *stems*, growing about 2 feet high. *Leaflets* obovate, thickish, emarginate, glaucous. *Stipules* ovate, shorter than the petiole.

Peduncles axillary, much longer than the leaves, usually two-flowered. *Flowers* small, yellow. *Calycine segments* lanceolate, longer than the tube, but shorter than the corolla. *Corolla* yellow. *Legumes* usually twin, long and torulose. It is a native of Piedmont and about Nice, where it grows abundantly.

THE LOTOS OF ITALY is one of the ebony-wood trees, called in our catalogues *Diospyros Lotus;* it is also known by the names of Date Plum and European Lote. It forms in the south of Europe a deciduous tree upwards of 30 feet in height. The *leaves* are oblong, acuminated, downy beneath, and slightly so on the upper surface. The *leaf-buds* are hairy inside. The *flowers* are small and reddish-white; and the fruit attains the size of a cherry, is yellow when fully ripe, and is then sweet, with considerable astringency.

This tree is a native of the western parts of the Caucasus, the Woods of Hyrcania, and the whole coast of the Caspian, Italy, and the Mauritania. The wood of old trees of this and several other species, becomes excessively hard, and is introduced to us under the name of Ebony, being very black, and taking a good polish. The plant was introduced in 1596, and grows freely in the open air.

THE LOTOS OF HIPPOCRATES is a species of Nettle-Tree, a native of the south of Europe, called *Celtis australis;* it is, however, well known by the appellation of Lote Tree, and is reckoned among the largest timber trees in the European Woods; and the wood, too, is one of the hardest with which we are acquainted, and it is also very tough and flexible. The *leaves* are of a cheerful light green colour; and the *fruit* are about the size of a wild cherry, yellow at first, but when quite ripe, of a glossy black. The flavour also is very pleasant. It is said that in France the forked branches are peeled, and made into hayforks, and are used for various agricultural purposes. The discovery of this plant being the Lotos of Hippocrates, is attributable to Tournefort, and the description appears to agree in every respect.

The fourth plant called Lotos by the ancients, is the *Zizyphus Lotus* of our Catalogues, the *Rhamnus Lotus* of Linn. and Mungo Park, and the *Jujube Lotus* of some authors; a species belonging to the Natural Order, *Rhamnaceæ.* And this is generally believed to be—

THE TRUE LOTOS OF THE LOTOPHAGI.—This plant is a native of Persia, and the interior of Africa, in the kingdom of Tunis, especially in a tract called *Jereed*, Sicily, and Spain. The Arabic name of it is *Nebbek,* and two sorts are described as growing at Daufoor: one forms a considerable-sized thorny tree, and is called *Nebbek-el-Arab*; the other is our present shrub, which the Arabs know better by the provincial name of *Seedra;* the fruit of this are smaller, of a darker colour, and much better flavour than those borne by the tree. The natives eat these both fresh and dried; they are generally left to dry on the trees, where they hang without injury during the greater part of the winter; they then have a very delicious flavour, and being formed into a paste, are used as provision on journeys, and much relished.

THE ZIZYPHUS LOTUS, in its native countries, forms a deciduous shrub 3 or 4 feet high. The habit is that of a Rhamnus. The *leaves* are small, alternate, ovate-oblong, slightly crenated, blunt, smooth, three-nerved. *Prickles* twin, one recurved, the other straight, longer than the petioles, situated in the axils of the leaves. *Flowers* small, solitary, axillary, resembling those of *Z. vulgaris* or Common Jujube. *Fruit* a drupe, round, the size of a wild cherry, very sweet, with a slight and pleasant acid, yellow when ripe, and occasionally tinged with purple. *Pulp* farinaceous, easily separated from the stone, resembling that of figs or dates. *Seeds* inclosed in a small, round, bony, two-celled nucleus.

The plant was introduced to this country in 1731, and is said to be found in the Eastern as well as the Western extremity of the African Desert, and Major Rennel thinks he has seen it on the Ganges. Dr. Shaw found the fruit common in Barbary, where it is sold in the markets in all the southern district. Cattle are also fed with it, and a liquor is extracted which will inebriate and is much esteemed, but will not keep. Mr. Mungo Park found the plant common in all the kingdoms of Africa which he visited; but it has been thought that the kind he saw at the Gambia is another species, and not *Z. Lotus.*

Z. Baclei or Bacle's Jujube is supposed to be the plant, as it grows abundantly in Senegal. It is, however, a far more tender species. The *Z. Lotus* also grows in the greatest plenty in the kingdoms of Koarta, Ludamar, and the northern parts of Barbary.

The ripe fruit are collected by spreading a cloth upon the ground and beating the branches with a stick. They are then well dried, and afterwards pounded gently in a wooden mortar, until the farinaceous matter is separated from the stone. The dried pulp is then mixed with a little water, and made into cakes, which are dried in the sun, and then resemble both in colour and flavour the very best gingerbread.

The stones are afterwards put into a vessel of water, and shaken about so as to separate the farina which may still adhere to them; this gives a nice flavour to the water, and when thickened with millet, it makes a nice gruel, called "*Fondi.*" This gruel forms the common breakfast of nearly all the middle and lower classes in many parts of Ludamar, during February and March.

The Lotophagi, or Lotos-eaters, as the Greeks named them, were a people who lived on the sea-coast on the north of Africa, including the Gulphs of "Syrtes," the Island of Meninx (now Jerba), and the coast beyond it as far as the lake and river Tritonis to the Mechlies.

Various opinions, however, have been advanced as to the extent of the locality occupied by these people. Scylax includes all the tribes between the two "Syrtes," under the name of Lotophagi: Ptolemy limits them to the neighbourhood of the river "Cinyps;" Herodotus confines them to the west of the river "Cinyps;" Strabo places them in the neighbourhood of "Jerba," although he calls the adjoining Syrtes that of the "Lotophagi;" Pliny assigns them, in addition to the island, the environs of the Syrtes also. All the people, however, inhabiting the countries bordering on the desert appear to have been Lotos-eaters; and the limits mentioned by the various writers, as above, arose no doubt from the want of their not having sufficient acquaintance with the inhabitants of these countries.

Zizyphus Lotus is nearly hardy, requiring nothing more than the shelter of a common greenhouse, or even a conservative wall, but to secure a crop of fruit it will be advisable to give a little warmth during the growing season, and let the wood be well ripened.

Propagation is effected by cuttings planted in sand, and placed under a glass in heat.

ON THE BALSAM TREES PRODUCING MYRRH AND BDELLIUM.

There are few vegetable products that require a more careful investigation than the plants yielding the celebrated gum-resins of commerce, familiar to us under the name of Myrrh, and the Bdellium or Googul (Moogl of the Arabians—*βδελλιον* and *μαδελκον* of Dioscorides, according to the account in Dr. Royle's "Researches.") We are, therefore, much indebted to Dr. Stocks for the account here given of the Googul or Googil of Scinde. In the MS., however, this gentleman had called the plant by the name *Balsamodendron Roxburghii*, from an idea that it was identical with the *B. Roxburghii* of Arnott, (the *Amyris commiphora* of Roxburgh), a native of north-eastern Bengal. A comparison of specimens of both, in my Herbarium, has satisfied Dr. Wallich and myself that the two species are very distinct. It is true it bears the same name among the Bengalese as the Scinde plant; but that name appears to be given to different plants yielding a somewhat analogous product; as, for example, the Googul or Googil of the Coromandel coast, which Dr. Stocks observes, is the *Boswellia Glabra.* But it is extremely improbable that a plant of the North-eastern frontier of Bengal should be identical with one of Scinde, where the vegetation bears a striking resemblance to that of Syria or Arabia. Dr. Roxburgh, too, observes that though his plant, when broken or bruised, diffuses a grateful fragrance like that of the finest Myrrh, yet that the "juice never congeals, but is carried off by evaporation, leaving little or nothing behind; and all that he could ever procure was a very minute portion of gummy matter, which certainly resembles Myrrh both in smell and appearance, but has no tendency to be even tenacious or elastic." The excellent Dr. Royle, however, rather inclines to the opinion, that this tree, when old, does yield a gum-resin, closely resembling Myrrh, because that which he examined, "was said to come from the hills, at the foot of which the tree is found." Be that as it may, it is very certain that the Mukul or Googul Balsam Tree of the Persian Gulf here described by Dr. Stocks, is a very distinct species; and the gum-resin it yields, is much more likely to be that of the ancient writers on the subject; for it is assuredly the genuine Googul of the "Bazaars of Hydrabad and Kurrachee," and that which is exported from Bombay. I have ventured to give it the name of Balsamodendron Mukul, rather than of "Googul," which latter appellation is clearly given to three different plants. My only doubt has been, whether I shall not refer it to *B. Myrrha* of Nees (represented in Royle's valuable "Manual of Materia Medica," page 339, fig. 56), from Gison on the borders of Arabia Felix, from which shrub Ehrenberg and Hemprich collected "some very fine Myrrh." The flowers, indeed, were not known, but the figure is a very good representation of the fruiting state of the plant so far as can be judged without the aid of analysis. Dr. Royle justly remarks "That the whole of the species of the genus require to be carefully examined from good and authentic specimens, accompanied by their respective products, before the several doubts can be resolved." Dr. Stocks is happily placed for carrying out such investigations, and he has fulfilled Dr. Royle's injunctions most accurately in the present instance, both in descriptive matter and figure.

I may here add that the *Heudelotia Africana*, Guil. et Perot. "Flora Senegambiæ" (*Balsamodendron*, Arnott), is a species having great affinity to our *B. Stocksii*, but it differs essentially in the very long tubular calyx, and yields "African Bdellium," or that imported into France from Guinea and Senegal, according to Perrottet. This would appear to be the "Niotout" described by Adanson ("Travels in Senegal") as yielding a kind of Bdellium. Of all this group of useful gum-resins (*Balsamodendra*), it may be said that this African species and the Scinde species are the only ones satisfactorily ascertained to the present day.

The gum-resin Googul has had its synonymes traced out by Sprengel, in "Hist. Rei Herbariæ," i. 272, followed by Ainslie in "Materia Indica," i. 29, and Royle in "Illustr. Bot." Himalayan Mountains, p. 176. It is the Mukul of the Persians and Arabians, and the Bdellium of Dioscorides, and Genesis, (?) ii. 12; Numbers, xi. 7. There has always been, however, some degree of uncertainty about the tree from which it is obtained.

It is unnecessary here to dwell on the idea of Kæmpfer, "Amœnitates," p. 668, that it is produced by the *Borassus flabelliformis*; or of Matthiolus, that it comes from the *Chamærops humilis*. Moreover, it has no connection with the Googul of the Coromandel Coast, which is the Koonder Gum from the *Boswellia glabra* (Ainslie, i. 136). Virey ("Hist. des Medicamens," p. 291,) first suggested that Bdellium came from an Amyris, the (*Niotoutt* of Adanson, Voy. 162; *Heudelotia Africana*, "Flora Senegambiæ," i. 150; *Balsamodendron Africanum*, Arnott, in "Annal. Nat. Hist." iii. 87.) It is probable, indeed, that African Bdellium is yielded by this shrub, which is closely allied to the Googul Tree of Sylhet and Assam, which Dr. Roxburgh had growing in the Calcutta Garden, and described in the "Flora Indica," ii. 244, under the name of *Amyris Commiphora*, with the Sanscrit synonym of Googula; but he was not aware of its yielding a bazaar gum. In the "Hortus Bengalensis" this same plant appears as the *Amyris Agallocha*, which was probably the name finally adopted by Roxburgh, from some suspicion of the distinctness of Jacquin's plant (*Commiphora Madagascariensis*, Jacq., "Hort. Schoenbr.," ii. pp. 66, et 249), the supposed identity of which had suggested the specific name in the "Flora Indica."

The alterations, however, had not been entered in the MS. of the "Flora Indica," when death deprived India of its most methodical and accurate Botanist. Royle grew this plant in the Saharunpore Garden, and was informed that it produced the Googul gum-resin, but recommends (Himalayan Bot. and more recently in his work on "Materia

Medica," Lond. 1847) that the subject should be followed up by those who have the opportunity of examining the flowers, and collecting the gum.

The tree now under consideration is abundant on rocky ground in Scinde, about Kurrachee, Garrah, Tattah, Jerrok, &c.—in short, wherever the limestone formation extends. It is therefore, most probably, very common in Beloochistan, and up the Persian Gulf, and is one of the plants connecting the Syrian and Indian Floras. This shrub is called Googul or Guggar, by the Hill Beloochees, who indeed do not know it by the name of Mukul. It yields the gum-resin, Googul, which they collect and bring to the bazaars of Hydrabad and Kurrachee, where it sells at the rate of two rupees the maund of 80 lbs. At Bombay its tariff valuation is two rupees the maund. It is collected in the cold season by making incisions with a knife in the tree, and letting the resin fall on the ground. Hence the dirty and impure state in which it is found in the shops. I have obtained it from September to February, and have found it exude in large tears, from a clean incision of the colour, consistence, and opacity of "*pus laudabile.*" My informants say, that from half to a whole seer, is yielded by a single tree. It is esteemed cordial and stimulant. It hardens and turns brownish-black very slowly. Made up into a cake with bajree flour, it is commonly given to horses and cattle when they have a cold. The dealers from Cabool have a custom of administering it to their horses in the cold season, thinking that it keeps them in health and condition.

The fruit and young shoots are applied to a similar purpose. The gum is made into a plaster, and used to discuss tumours and boils, and is regarded as efficacious in expelling the guinea-worm, both taken internally and applied to the tumour. It is extensively employed by the Hindoos as incense for burning in their temples, although its smell is by no means agreeable. It is also much prized by builders, who mix it with the mortar and plaster used in the construction of houses of a somewhat superior description, where durability is an object. The Googul is boiled in water for a considerable time, when its spirit (as they phrase it) is communicated to the water, and the dregs are thrown away. This solution of the gummy part, which, according to Newman's Analysis, should be six drachms two scruples in every ounce, is mixed with lime to prevent it from crumbling, and splitting. The Googul water is sometimes washed over the walls by itself.

In Puryàni (Syriac), *Mukld;* in Rumi (Greek), *Budliyún;* in Arabic, *Kafr* (Bitumen or Pitch, called also *Kafr ul Ya-hud*, or Jew's Pitch), and *Kawar;* in Persian, *Búi Tahúdán* (the Jew's perfume, because that people use it in fumigation); in Hindostanee, *Gúgal.*

It is the gum of a large tree, about the size of the Kundur (*Olibanum*), growing plentifully upon the shores of the sea of Uman (the sea on the E. coast of Arabia), and in Sanjar (Khorasan?), and India.

Its general characteristic is bitterness, and it is of many kinds, as *e. g.* 1st *Mukl-i-arzak* (bluish Bdellium), in colour reddish and bitter; 2nd, *Mukl-el-Ya-hud* (Jew's Bdellium), of a yellowish tinge; 3rd, *Mukl-i-sakalbi*, which is clouded, impure, black, and soft; 4th, *Mukl-i-Arabi* (Arabian Bdellium), which grows in Yemen, and is of the colour of the Badanjan (ripe fruit of the Egg-plant, *i. e.* greenish-black). The best kind is clear, pure, and readily dissolves in water. It must be unmixed with wood, straws, sand, earth, or such matters. Its properties last for twenty years. When old, its bitterness increases; and the older it is the darker it becomes, exchanging its softness for dryness and hardness, especially the Arabic, as they mix it with myrrh.

My friend, assistant-surgeon Carter, showed me a fine specimen of the "Mukul" gum collected by him on the southern coast of Arabia, together with numerous other gums, all accompanied by admirable drawings of the trees producing them. There is, therefore, some error in the statement of Dr. Malcolmson (Royle's "Materia Medica"), that Bdellium is not produced in Arabia; moreover, the "Mukul" and the tree producing it, are, from Dr. Carter's specimens, identical with the Scinde Googul and its tree, as might be expected from the great similarity between the vegetation of the rocky part of Scinde and that of Arabia. The range of our Googul Tree is, therefore, Arabia (Dr. Carter), and, according to my own observations, in rocky ground throughout Scinde, at Deesa in Marwar, and lately in Beloochistan Proper; it flowers in March and April, and the leaves and young shoots appear in April and May. In sheltered situations, as under the bank of a water-course, it may be found in fruit, flower, and leaf, for the greater part of the year.

This shrub is called Bayee by the Hill Belooches, who make no use of it. Its young shoots and buds are remarkably fragrant when bruised. In the cold season it yields a small quantity of a tasteless inodorous brittle gum, almost entirely soluble in water. It flowers in March and April, and its leaves and young shoots appear in April and May. It is a native of Beloochistan, and the hills which separate that province from Scinde, probably also of Affghanistan; attaining its southern limit about Kurrachee.—*Hooker's Journal of Botany.*

MISCELLANEOUS.

New and Rare Plants in Flower. *Portlandia grandiflora.* At Ealing Park we recently observed the above-mentioned old stove evergreen in a much finer state than it is usually to be met with.

It is a genus which few collections contain, and still fewer flower well, although in possession of it; but that it is susceptible of being rendered proliferous of blossoms, and a plant of no inconspicuous mien when in a blooming state, was attested by the condition of the specimen we saw in Mrs. Lawrence's collection, exhibiting its pure white, deliciously scented, Brugmanzia-like flowers with the greatest freedom, which being axillary in the manner of their production, the contrast with the dark green ample foliage is a most agreeable one. Mr. May, the principal gardener at Ealing Park, states that in according it the usual treatment of vigorous-growing stove genera, he experienced no difficulty in inducing a plentiful development of inflorescence during the greater portion of the year.

Funkia grandiflora. We noticed the above beautiful new species in the Lily Nursery of Mr. Groom, Clapham Rise, displaying a profusion of long-tubed, conspicuous flowers, partaking of the whiteness and sweetness of the delicious Tuberose. It is of continental origin; the foliage good; and although at present pot-grown, and treated by Mr. Groom as a half-hardy species, it will doubtless prove to be as hardy, and to succeed in a warm, well-drained border, with the precaution of a slight protection in winter, equally as well as any of its congeners.

Ipomœa. A new species, grown from seeds introduced by their own collector from Java, is at present blooming in Messrs. Rollisson's Nursery, Tooting; but whether an annual or not, is at present unknown. It is growing in the stove, and has the appearance of being a vigorous free-flowering stove climber, with alternate bright green leaves and rich crimson-violet, Petunia-like flowers distinctly margined with white, and more than two inches across; the tube nearly two inches, and footstalk about one inch in length.

Chirita Moonii. The largest specimen we have yet seen of this fine species latterly came under our notice in the Dowager Duchess of Northumberland's grand conservatory at Syon House, exhibiting a profusion of its noble Digitalis-like blossoms. Every collection, where the Gloxinia and Gesnera are grown, should also include the species of Chirita under notice, a plate, and ample directions respecting the culture of which are given in an early number of our new Magazine.

Gesnera picta. This is one of Messrs. Veitch's introductions, and a strong, rather coarse-growing species with good foliage, well adapted for a large roomy stove or stove-conservatory, like that at the Royal Botanic Gardens, Kew, which recently contained a fine specimen in a copious condition of bloom. Messrs. Veitch produced two specimens of this plant at the Horticultural Society's meeting in Regent Street, on the 4th ult., exhibiting little difference (except in brilliancy of colour) in their orange-scarlet inflorescence, although a very considerable distinction was apparent in the foliage—the leaves of one being rough, dark green, and chocolate, coloured beneath; those of the other smoother, of a paler verdure, and whitish-green underneath.

Gloxinia Knightii, and *G. Perryana.* Two very distinct and pretty seedling Gloxinias, distinguished as above, were a short time ago blooming in the Exotic Nursery at Chelsea, of the gentlemen whose names they respectively commemorate.

The first-mentioned variety has very neat foliage of a glossy verdure, and handsome well-expanded flowers, white and brilliant carmine in colour; the latter is a handsome foliaged, red-flowering seedling; the interior of the corolla being richly stained with glowing crimson.

Fuchsia pumila. One of the prettiest plants for forming a dwarf bed in the flower-garden, or for the decoration of small vases, flower-stands, &c., that we have for a long time met with, is the above appropriately named Fuchsia. The general aspect of this pretty little plant is very neat and compact; the foliage minute, and dark green, forming a pleasing contrast when gaily bespangled with its red flowers, the corollas of which are of an intense bluish violet. When grown in the open border (as at the Wellington Road Nursery, where we noticed it planted out) it attains about a foot in height, but at Messrs. Knight and Perry's Nursery, Chelsea, we observed it in a very dwarf condition.

Bignonia Chamberlaynii. In the Nursery of the gentlemen just alluded to, this beautiful old species has been in a fine state for several months past, completely covering the roof of a warm greenhouse or intermediate stove, where it is trained, and displaying its fine axillary panicles of orange-yellow flowers, in unrestricted profusion, forming a striking and pleasing contrast with its broad rich green foliage.

Like many other old, neglected, and in too many instances, almost lost and forgotten plants, which it is alike our province and gratification to bring thus prominently before the notice of cultivators; the subject of our notice (a fine plate of which is given in the fourteenth volume of our "Magazine of Botany") is a Brazilian species, introduced some thirty years ago, rarely to be met with, even in a condition of mediocrity; still less frequently do we find it in the enjoyment of such luxuriant beauty, or so prolific of its lovely blossoms, as it has appeared in the Exotic Nursery at different periods of our visiting there during the current season; and now, after having flowered profusely a good portion of the summer, we find it in autumn, and even on the approach of winter, commencing a fresh display of its floral charms.

It is a plant, the cultivation of which is attended with no difficulty whatever; and like the majority of the genus, will flower freely enough, provided a temperature somewhat higher in winter than that of the ordinary greenhouse, and plenty of room to permit its rambling propensity, is accorded it, either on the rafters, ornamental columns or trelliage of the structure, where it is grown.

Anemone Japonica, var. A good variety of the above showy species has been obtained by hybridization, in the Horticultural Society's Gardens, Turnham Green, a specimen of which was exhibited at the last meeting of the Society at the council rooms in Regent Street. Subsequently, we have been favoured with an opportunity of inspecting a large quantity together with some fine specimens in bloom in the Gardens of the Society, where it appeared to continue very true to the first appearances of improvement: in some respects it is undoubtedly superior, the flowers —though of a more pallid hue than the original (*A. Japonica*)—being more regular in the disposition and conformation of the petals, which before expansion, compose a more perfect globular arrangement, than is apparent in the old variety, with which it is on a par in other important respects, being equally as hardy, as conspicuous, and as proliferous of blossoms.

Tea-scented Roses. In the large conservatory attached to these (Horticultural) gardens, the Tea-scented Roses are conspicuously beautiful and attractive objects a considerable portion of the year, and finer specimens we have rarely, if ever, met with; on each occasion of our revisiting this establishment during the present season, these roses were exhibiting a profusion of their delightfully scented, gay flowers, and even now that the "year is on the wane," they give promise of a prolonged display.

Their attractiveness and ornamental efficacy, to say nothing of the delicious perfume which they exhale, since they seldom attain to much perfection out of doors, cannot be over-estimated either for large or small conservatories, where the temperature seldom ranges higher than that of a common greenhouse; for notwithstanding that the specimens in the Horticultural Society's large house have attained to an unusual condition of luxuriance (some of them being from six to ten feet high); by a constant attention to pruning, or *dwarfing* of Tea-scented Roses, by stopping and pinching back a few joints all the vigorously-inclined shoots, especially those produced towards the base, throughout the growing season, the plants will readily assimilate themselves to any reasonable space, and become more prolific in florescence.

The following are the principal sorts employed in the conservatory at Chiswick :—

Belle Allemande. A large, fine, rose cream, shaded blush.

Bougère, pale, rosy bronze.

Elise Sauvage, fine deep straw-colour, a splendid rose.

Hardy, vivid rose-colour.

Mançais, large buff, rosy centre.

Silène, rose, changing to crimson.

Triomphe de Luxembourg, buff and rose, very large and fine.

Madame Goubault, salmon, globular, large and beautiful.

Miranda. Jeanie Deans, &c.

Considerable variety is comprised in the foregoing, which are not confined in pots, but planted in the principal bed or central space of the conservatory, at intervals, amongst the specimens of New Holland plants, &c., where, trained out, and supported by two or three stout stakes, they produce a fine effect when in bloom, and an excellent succession of flowers is maintained by foreshortening a portion of their luxuriant shoots at intervals throughout the season of active growth.

Abronia umbellata. As a bedding plant, this novelty has, generally speaking, afforded as yet but little satisfaction to those who have planted it out, but we are inclined to hope that the disappointing results of its employment for flower-garden purposes, must be attributed to the circumstance of its succulent stems being permitted to repose in contact with the soil, and by that means become susceptible of "damping off" during a very humid state of the atmosphere and the ground.

When trained erect, however, its succulence is no barrier to its employment, and if protected somewhat, it will succeed very well in the open ground, and there is also every probability of its doing so, by the provision of small portions of rockwork, flints or scoria, for it to recline upon; but apparently it is too delicate a plant for full exposure to rough weather, where the sweeping breezes of early autumn can pass over it, unbroken and unprotected by artificial precautions; hence, if its culture in the open air be attempted at all, a sheltery site must be allotted it, and although this cannot well be accomplished in the fully exposed parterre, where the gay vervain and its more sturdy compeers will flourish, heedless of the breeze that rushes o'er, or plays around them; a situation might be found in some sheltered nook of the flower-garden, to shield this pretty plant from the brisk western gales we not unfrequently experience in the midst of summer. The best specimen we have yet seen of it, and the best state we have yet met with it in, is at the Pine-apple Place Nursery, where a plant that has been growing out of doors the greater part of summer, trained erect, and supported by flower sticks, has become a branching specimen four feet high, and displaying its very pretty corymbs, of ruddy lilac blossoms, in tolerable profusion.

The plant in question, which is growing in common garden soil, appears likely to seed freely, and its caulescence has attained an unusual degree of vigour, some of the stems being of a greater circumference than the pen-holder in our hand.

NEW AND BEAUTIFUL PLANTS FIGURED IN THE BOTANICAL PERIODICALS.

Aristolochia macradenia. *Large glanduled Birthwort.* This curious plant flowered in a warm greenhouse of the Royal Gardens of Kew, in the spring of 1849, and had bloomed the year before with John Taylor, Esq., of Sheffield House, Kensington, which latter gentleman imported it from Real del Monte. It is one of the most remarkable and distinct of the many species of the genus. It may be grown in a pot kept in the stove, and is propagated by cuttings.—*Bot. Mag.*, 4467.

Cyrtanthera aurantiaca. *Orange-flowered Cyrtanthera.* This fine species was introduced to Messrs. Henderson's of Pine-apple Place, from Belgium, under the name of *Calcostylis aurantiaca*, but nothing is known of its native locality or original introduction. It is a stove plant, and requires to be grown in a moderately small pot; it is well always to keep a succession of young plants, as it is apt to become naked and unsightly after flowering.—*Bot. Mag.*, 4468.

Pentstemon cyananthus. *Azure-flowered Pentstemon.* A most beautiful blue-flowering perennial kind, bearing a spike of bloom more than a foot long. It is an inhabitant of the upper valleys of the Plate River, in the Rocky Mountains, where seeds were collected by Mr. Burke. These seeds were reared by Messrs. Lucombe, Pince, and Co., in whose nursery, at Exeter, the plants flowered beautifully, in the open air, in May, 1849. The species is doubtless quite hardy, and a great acquisition to our flower borders. It is desirable to have a succession of young plants always on hand, which may be raised by cuttings early in the summer, and which should be sheltered in a frame during the winter, but with as much exposure as the weather will allow.—*Bot. Mag.*, 4464.

Roupellia grata. *Cream-fruit.* A very handsome and very fragrant plant of tropical Africa, noticed by Afzelius as the *Cream-fruit*, so called, we presume, from the use occasionally made of the cream-like juice of the fruit, but of which little seems to be known beyond the bare mention of it under that name. It is a native of Sierra Leone (introduced to our stoves, we believe, by Mr. Whitfield), and in May, 1849, flowered in the collection of Mrs. Halford, of Newcourt, near Exeter. If the plant comes into general cultivation, it cannot fail to be much prized, if not for the fruit, yet assuredly for the size, beauty, and fragrance of the flowers. The habit of the plant is climbing, and requires to be grown in a warm moist stove, and is propagated by cuttings.—*Bot. Mag.*, 4466.

Sauromatium guttatum. *Spotted Sauromatium.* A very remarkable Arodeous plant, native of the East Indies, where it is probably not uncommon. Dr. Wallich detected it in Nepal, Blume in Java. Roots were sent to the Kew Gardens by Mr. Law, of Tanna, in Bombay, in 1848, which flowered in the spring of 1849. The flower is yellow-green, thickly spotted with reddish-purple. The tubers lie dormant during the dry season, coming quickly into flower and leaf on receiving the stimulus of moisture. It requires the heat of the stove.—*Bot. Mag.*, 4465.

Sida (Abutilon) venosum. *Veiny-petalled Sida.* A large greenhouse shrub, introduced to England by way of Belgium, perhaps a native of South Brazil. The blossoms are large, of a golden orange-colour, richly veined and reticulated with brown, and exceedingly handsome. It requires a greenhouse or conservatory, and should be planted out in a prepared border of any good garden-loam, mixed with a little leaf-mould or sandy peat-soil.—*Bot. Mag.*, 4463.

CALENDAR OF OPERATIONS FOR OCTOBER.

FRUIT AND VEGETABLE DEPARTMENT.

Glass.

Cherries, Figs, Peaches, and **Vines** in pots or tubs intended for forcing early, should now be examined, and top dressed or shifted, if found necessary.

Grapes for use during the winter should be supplied with plenty of air, and a little fire for an hour or two every day when the weather is damp, but no heat should remain in the flues at night. Cut away all decaying berries from the bunches; and all superfluous lateral wood from the vines.

Peach Houses and **Vineries,** for the earliest forcing, should now be prepared for operations, so that no delay may be occasioned next month. Cover the vine borders with a thick coat of litter or half-rotted manure.

Pineries. Fruiting plants must have a lively heat kept up, about 70° or 80° with sun, by day, and 65° by night, with a moist atmosphere, and a moderate circulation of air. The successions may be kept cooler, with more air and less moisture.

Open Air.

Asparagus beds may be cleaned, cutting off the haulm, covering the surface with a good coat of manure and a fair sprinkling of salt, to be washed in by the winter rains.

Cauliflowers, sown in August, should be planted in frames or under hand glasses, or be potted in 5-inch pots, and sheltered in pits.

Celery should be earthed fully during this month, or the frosts will soon rupture the stalks.

Endive and **Lettuce** tie up to blanche; and not later than the middle of the month plant a quantity of the latter, which were sown in August, on a warm well-manured border. It is a good plan, also, in the northern parts of the country, to prick out a quantity in frames and pits; these are sure to stand the winter securely.

Cabbages should also be planted out in the beginning of the month for spring use.

Gather Apples, Pears, &c., and house them before they are injured by frosts, and lay them thinly in the fruit room.

Planting Fruit Trees, trenching unoccupied quarters, removing worn-out soil, and renewing with fresh maiden loam from a pasture, are amongst the numerous engagements of this month.

FLOWER DEPARTMENT.

Glass.

Conservatory and Greenhouse. Camellias, Chinese Primroses, Cinerarias, Chrysanthemums, Cyclamens, Lachenalias, Tree Violets, and many other things will now be coming into full bloom. The Camellias and Chrysanthemums will be benefitted by a moderate supply of weak liquid manure, and supply all the inmates of this department with a very liberal supply of light and air. Be careful that nothing is over-crowded; it is better not to allow one plant to touch another if possible, but in most places this can scarcely be expected. Gradually diminish the supply of water, so as not to overcharge the plants during the torpid season.

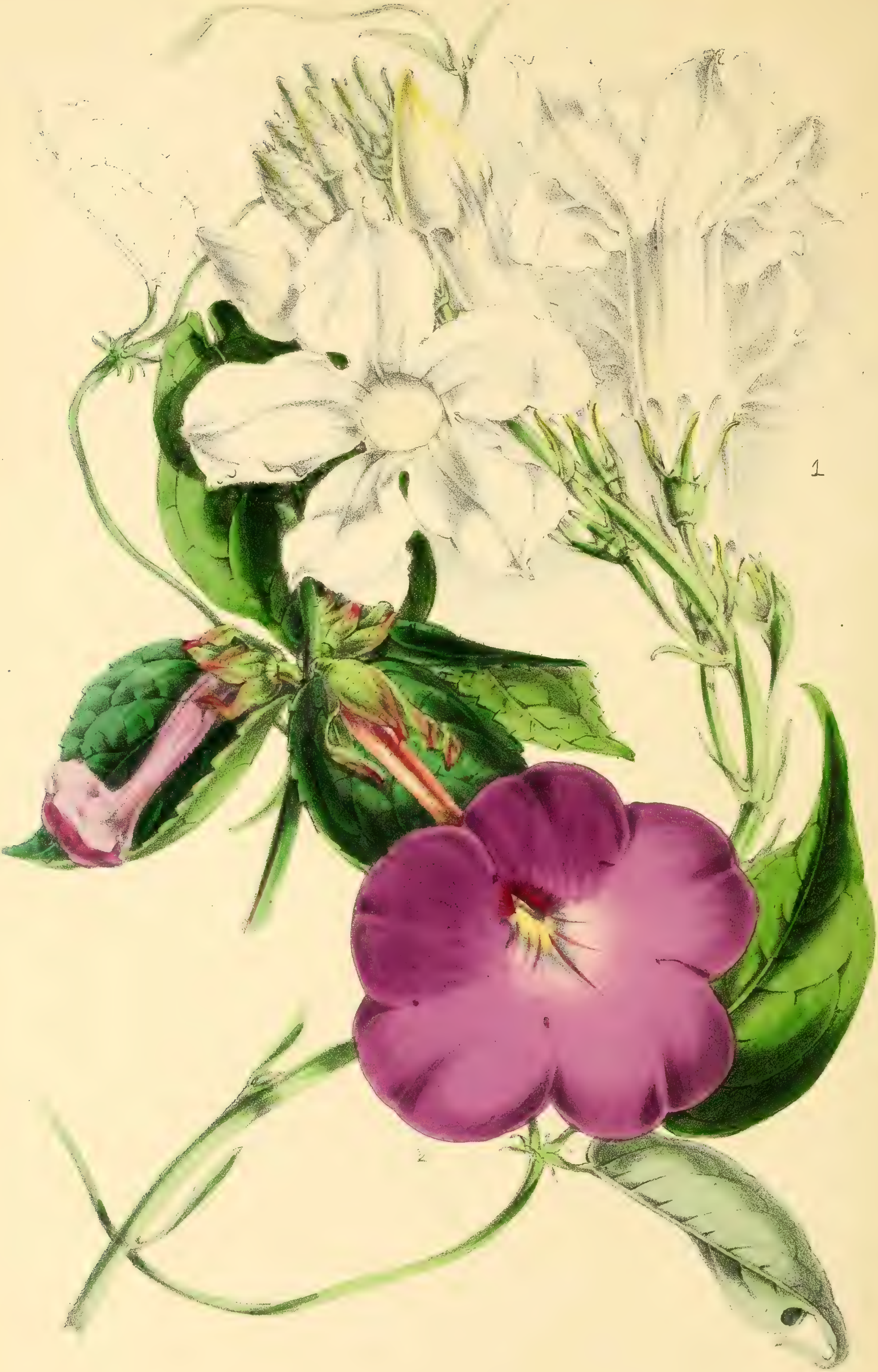
Orchid House and Stove. Cypripedium insigne and venustum, Phaius grandifolius, and Stenorynchus speciosus, and many others will soon exhibit their blossoms; give them the usual heat and moisture. All those kinds requiring repose at this time of the year, place in a lower temperature, and withhold moisture as the plants ripen. Euphorbias, Gesneras, Plumbago rosea, and many other stove plants coming into bloom, should be supplied with the requisites for their encouragement. Roses in pots, Weigela rosea, and other plants in pots for forcing, may be introduced to a gradual warmth towards the end, but must have plenty of air, and a good supply of water at the roots.

Open Air.

Alterations may now be carried on expeditiously, Shrubs and Ornamental Trees planted any time after the middle. Bulbs for early flowering should be got in as quickly as possible. Mowing, cleaning, hoeing tender stock, hitherto in the flower beds, and well rolling lawns, are among the chief things at this season.

NURSERY AND FOREST DEPARTMENT.

Acorns collect and sow, drain land, trench, and otherwise prepare for forming plantations.



1 Mandevillea suaveolens.
2. Achimenes Kleeii.

PAXTON'S
MAGAZINE OF GARDENING AND BOTANY.

ACHIMENES KLEEI. (Mr. Klee's Achimenes.)

Class, Didynamia.——*Order*, Angiospermia.——*Nat. Order*, Gesneraceæ.——(Gesner-worts, *Veg. Kingd.*)

Generic Character.—*Calyx* with its tube adnate to the ovary; limb five-parted; lobes lanceolate. *Corolla* tubularly funnel-shaped, often swollen at the base, limb five-cleft; lobes sub-equal, sub-rotund. *Stamens* four didynamous; anthers not cohering. *Rudiment* of the fifth stamen situated below the base of the corolla. *Nectary* glandular, in a small ring. *Style* slightly thickened towards the stigma, obliqne, or with two separate lobes. *Capsules* nearly two-celled, two-valved; placentas parietal, subsessile.

Specific Character.—*Plant* perennial. *Roots* tuberous. *Stems* herbaceous, somewhat erect, pilose. *Leaves* opposite, ovate-acuminate, serrate, with unequal petioles. *Pedicels* longer than the calyx. *Calyx* slightly pubescent. *Corolla* rosy lilac, dark near the mouth of the tube, and with a dash of yellow in the throat. *Limb* spreading.

Authorities and Synonymes.—Achimenes Kleei of the Nurseries.

This new Achimenes is a native of Guatemala, whence it was introduced to Messrs. Lane, of Berkhampstead, through Mr. Skinner, who discovered and sent it to the above gentlemen in June, 1848, and in whose stove it flowered for the first time in August of the same year.

It is a very neat growing species, and its flowers are gay-coloured, and of a good size, rendering the plant altogether equal to most, if not all, which have been previously brought into cultivation.

In cultivation give exactly the same treatment to this as the other species, namely, pot in a light, rich soil, and water freely whilst in a growing and flowering state; but after the flowering season, diminish the quantity of water gradually, and when the tops are dead keep the soil perfectly dry until the roots show signs of growth again, then separate them from the old soil, re-pot as before, and subject to heat and a gradual increase of moisture, until they fully develope themselves, and the flowering season again commences.

They are readily propagated by cuttings of the stem, or by the imbricated buds or tubers which are produced both on the stem and beneath the soil.

Our drawing was prepared from two plants, one in the possession of Mr. Glendinning, and the other at Messrs. Lane, of Berkhampstead, which flowered in August last.

The meaning of the generic name is unknown; the specific appellation is given in honour of Charles Rudolph Klee, the Prussian Consul-General in Guatemala.

BROWALLIA SPECIOSA. (Showy Browallia.)

Class, DIDYNAMIA.——*Order*, ANGIOSPERMIA.——*Nat. Order*, SCROPHULARIACEÆ.——(Fig-worts, *Veg. Kingd.*)

GENERIC CHARACTER.—*Calyx* membranous, tubular, ten-ribbed, five-toothed. *Corolla* salver-shaped, resupinate from the contortion of the peduncle ; tube fifteen-nerved, ventricose at top ; *limb* oblique, five-lobed. *Stamens* four, didynamous, without any rudiment of a fifth. *Anthers* of the upper filaments reniform ; of the lower ones parallel with the filaments, having the upper cell the smallest, and sometimes abortive. *Ovary* surrounded at the base by a large, cup-shaped, fleshy disk. *Stigma* two-lobed, four-tubercled, with two excavations on the back for the reception of the upper anthers. *Capsule* oblong, two-celled, two-valved, many-seeded. *Dissepiment* contrary. *Placentas* two, fleshy. *Seeds* angular.

SPECIFIC CHARACTER.—*Plant* a shrub. *Stem* erect, branched, glabrous (as is almost every part of the plant). *Leaves* sometimes opposite, sometimes alternate. *Peduncles* axillary, solitary, single-flowered, in general shorter than the leaf. *Calyx-tube* ovato-cylindrical ; *limb* of five, erect, subulate segments, nearly equal in length with the tube. *Corolla* hypocrateriform ; *tube* long, slender, thrice the length of the calyx ; *limb* oblique, somewhat two-lipped, of five large, spreading, ovate acuminate segments, striated pale-lilac beneath, dark-purple above ; *throat* white. *Stamens* inserted in the faux, didynamous ; *filaments* short, ciliated, curved above. *Anthers* didymous. *Ovary* globose on a short small disc, two-celled. *Ovules* very numerous on a large central placenta in each cell ; *style* nearly as long as the tube of the corolla. *Stigma* two-lipped, four-lobed within the lips.

AUTHORITIES AND SYNONYMES.—Browallia speciosa, *Hooker* in *Bot. Mag.*, 4339.

THIS new species of Browallia, although less striking in the colour of its flowers than the *B. Jamesonii*, which we figured at t. 7. in the present volume, is yet in beauty not far behind it. Altogether it must be considered a very fine kind, the flowers in point of size are larger than those of any other known species, the colours are a bright purple shaded with blue, and are very conspicuous.

It is a native of Peru, where it was discovered by M. Purdie, growing on the Mountains of Tolima and Quindiu, in the year 1846, when it was introduced to the Royal Gardens at Kew, where it flowered in September, 1847.

The specimen from which our drawing was prepared bloomed in the stove at the nursery of Mr. Glendinning, of Turnham Green, in August last.

The plant requires only the ordinary treatment of other annual Browallias ; it however produces its flowers to greater perfection if favoured with either the heat of a stove or a warm part of the greenhouse.

For other particulars as to culture, &c., see page 5 of the present volume.

MANDEVILLA SUAVEOLENS. (Sweet-scented Mandevilla.)

Class, PENTANDRIA.——*Order*, MONOGYNIA.——*Nat. Order*, APOCYNACEÆ.——(Dog-banes, *Veg. Kingd.*)

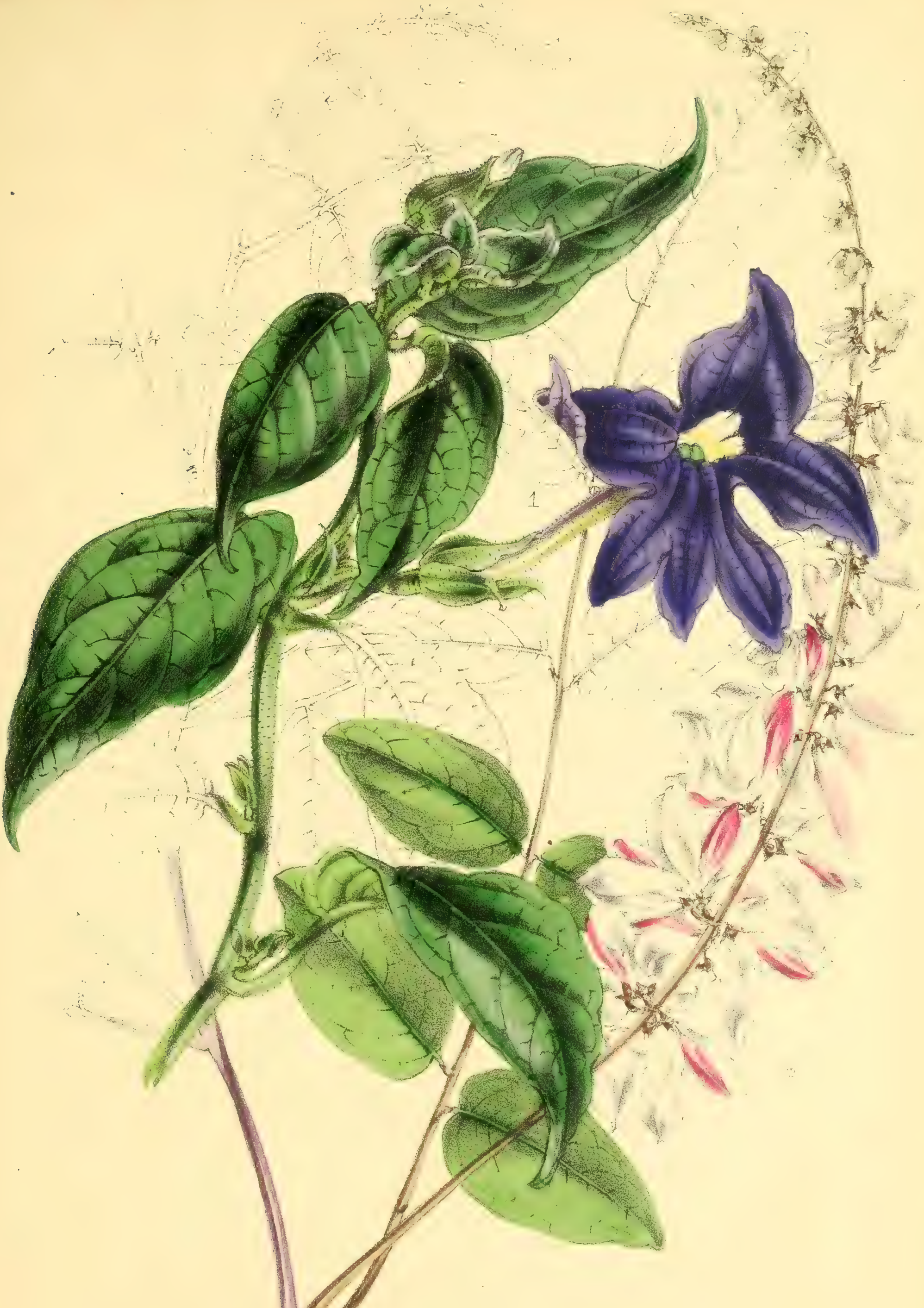
GENERIC CHARACTER.—*Calyx* pentaphyllous, imbricate, erect, with a comb-like ring on the inner side at the base. *Corolla* hypogynous, betwixt campanulate and funnel-shaped, having scales at the bottom of the tube ; *limb* five-parted. *Stamens* five, inserted at the base of the corolla, and included in the tube. *Anthers* adhering in a cone, round about and approaching the stigma ; top membranous. *Ovary* two-celled, many-seeded. *Style* one. *Stigma* conical ; *base* campanulate, five-lobed ; *top* two-pointed.

SPECIFIC CHARACTER.—*Plant* an evergreen shrub. *Stem* twining. *Branches* slightly pilose, whilst young, but becoming smooth as they advance in age. *Leaves* opposite, petiolate, betwixt cordate and oblong, membranaceous, glaucous beneath, smooth above. *Stipules* comb-like. *Racemes* axillary ; *peduncles* long, many-flowered. *Flowers* large, white, sweet-scented. *Calyx* green, tipped with purple. *Corolla* lobes of limb oblong, undulated at the margins, apiculate ; *tube* somewhat funnel-shaped, folded in ten plaits. *Filaments* pubescent.

AUTHORITIES AND SYNONYMES.—Mandevilla suaveolens, *Lindl.* in *Bot. Reg.*, vol. xxvi., t. 7.

THIS fine white-flowering twiner was introduced from Buenos Ayres by H. J. H. Mandeville, Esq., some years ago, and was beautifully figured by Dr. Lindley, in the "Botanical Register," v. 26, t. 7. Although nine years have elapsed since its publication, the plant is hitherto very little known, and by no means cultivated to the extent that its merits deserve.

Its twining habit and pendent snow-white flowers, emitting a most delicious fragrance, give the plant somewhat of the appearance of a Jasmine. It is a rapid grower, and



Holde. del & Lith.

1 *Browallia speciosa.*
2. *Indigofera decora.*

requires considerable space to run over; but if not stopped, it flowers very freely, and becomes a fine object.

The plant from which our artist prepared the plate bloomed in the greenhouse of Messrs. Henderson, Pine Apple Place, in August last.

Any light sandy well-drained soil will answer to grow it in, but it thrives best when planted out in a prepared border in the greenhouse or conservatory, where both its roots and tops can have full scope to grow.

Cuttings strike root freely in pots of sand, placed under a glass in heat.

The name was given by Dr. Lindley in honour of its discoverer and introducer Henry John H. Mandeville, Esq., Her Majesty's British Minister at Buenos Ayres, to whom this country is indebted for the introduction of many interesting plants.

INDIGOFERA DECORA. (The comely Indigo.)

Class, Diadelphia.——*Order*, Decandria.——*Nat. Order*, Fabaceæ.——(Leguminous plants, *Veg. Kingd.*)

Generic Character.—*Calyx* five-cleft; *lobes* acute. *Vexillum* roundish, emarginate. *Keel* furnished with a subulate spur on both sides, at length usually bending back elastically. *Stamens* diadelphous. *Style* filiform, glabrous. *Legume* nearly terete, two-valved, many-seeded, rarely few-seeded or ovate, one-seeded at the base or sub-globose. *Seeds* ovate, truncate at both ends, and usually separated from each other by cellular substance.

Specific Character.—*Plant* a shrub, smooth in every part of both stem and branches, and glaucous. *Leaves* pinnated, consisting of from three to eight pairs and an odd one; smooth on the upper side, but covered with fine hairs beneath; *leaflets* ovate, of a deep bluish green when old, tinged with brown when young. *Stipules* two to every pair of leaflets, bristle-like. *Flowers* in racemes, axillary, of a light rose colour, tinged and spotted with purple. *Calyx* green, five-toothed, the two upper teeth far apart. *Corolla: standard* oblong, rather keeled behind, pale-rose, spotted and pencilled near the base with delicate crimson lines; *wings* linear-lanceolate, ciliated, bright rose colour; *keel* pale, downy on the upper side.

Authorities and Synonymes.—Indigofera decora, *Lindl.* in *Bot. Reg.*, v. xxxiii., t. 22.

This is a plant of first-rate interest; it forms a very handsome, compact, and very graceful dwarf-growing shrub; it also bears a profusion of bloom, which continue to be produced in succession for a long time; and what renders it still more valuable is, that its flowering season is during the dark winter months, when blossoms much less beautiful are viewed with pleasure.

The plant was originally discovered by Mr. Fortune, in a cultivated form in the Nursery Gardens at Shanghai, in China, and through whom it was introduced by the London Horticultural Society in 1844. It has since found its way into most choice collections in the country, and is universally prized as a valuable acquisition.

It forms a hardy greenhouse plant, and grows freely potted in either sandy peat, and with a small mixture of light loam, and strikes very freely from cuttings planted in sand, and placed under a glass in heat.

Our drawing of this beautiful plant was made in September last, from one of our specimens then in bloom in the greenhouse at Chatsworth.

The generic name is derived from *indigo*, a blue dye-stuff, a corruption of *Indicum*, Indian, and *fero*, to bear; most of the species of this genus are handsome, and produce the well known dye called *Indigo*, which is especially obtained from *I. tinctoria*.

CHEMISTRY OF HORTICULTURE.—LIME.

By John Towers, Esq.

(Continued from Page 261.)

Lime—its combinations.—The subject of the last article naturally leads to the consideration of that peculiar substance which is found to be so important to the gardener and agriculturist. *Lime*—properly so called, that is, in the state of causticity which it assumes when burned in the kiln—is never found in nature: it is a preparation of art, by a process which shall be described in few words. Although pure lime be absent, the earth still abounds with native carbonate of lime in various forms and conditions, known as chalk, limestone, marble, and shell-marl.

" Lime in an impure state is prepared for building and agricultural purposes, by calcining in a kiln the ordinary limestones which abound in many districts, and very frequently from common pit or rock-chalk; in the former case it is termed stone-lime, and—if well and thoroughly burned in a kiln, so constructed as to admit a free passage of atmospheric air at the bottom—is found stronger and to make a better mortar than the lime made from common chalk. The process of burning the carbonate must be continued so long as is sufficient to discharge the whole of the carbonic acid; which, according to the calculation of Professor Clark (quoted in the last chemical article) amounts to seven-sixteenths of its weight, leaving nine ounces of common lime from every avoirdupois pound of the raw material. In the best contrived limekilns, the process is carried on continuously, broken limestone and fuel being constantly thrown in at the top, and the burned lime raked out at intervals from beneath." Dr. Fownes adds—" Sometimes, when limestone contains flinty matter (silica), and the heat has been very high, the lime refuses to slake, and is said to be overburned—in this case a portion of *silicate* has been formed."

Flinty matter, or siliceous sand, will unite chemically with lime, and Nature has produced this union abundantly: hence the reason that so much unslakeable lime is frequently met with.

Slaked lime is a combination of good lime with about one-third of its weight of water; so that 55 parts of quick or hot lime, absorb 17 parts of water by weight, and in this slaked state it is called by chemists *hydrate of lime*, a term which implies the chemical union of lime and water, by which the solidification of the latter is induced. The hardening of mortars used for building (wherein slaked lime is mixed with a given quantity of siliceous sand) is effected by the gradual absorption of carbonic acid, which, combined with the attraction or affinity exercised between lime and silica, produce a solid silicate of lime. A great length of time is, however, required, before these combinations become complete.

There are other lime cements which harden like a rock, and resist the action of water. One of these is the substance now so much employed as *Concrete*, for the foundation of buildings. The other is called Roman or Parker's cement. Concrete is formed by incorporating gravelly pebble-stones with a known proportion of dry, powdered (not slaked) quick-lime, on which a quantity of cold water is poured by one labourer, while another works and thoroughly blends the materials with a shovel. Chemical action takes place, the lime slakes, and a *silicate* is gradually formed, solid and indestructible, as is the natural concrete called " plum-pudding stone," in which doubtless our artificial preparation found its origin. These natural cements comprise oxide of iron, flinty matter, and alumina, under the agency of decomposing water. Parker's cement, according to Dr. Fownes, is made from the nodular masses of calcario-argillaceous iron-stone found in London clay. " When ground to powder and mixed with water, solidification speedily ensues from causes not thoroughly understood, and the cement once in this condition, is unaffected by wet."

Lime, chemically pure, can be made by dissolving white marble in dilute muriatic acid, (i. e. spirit of salt—now called *hydrochloric acid*). To the clear solution a little caustic ammonia is added drop by drop: it is then filtered, and liquid carbonate of ammonia added till it ceases to produce any precipitation of pure carbonate of lime. The precipitate is then washed, dried, and exposed to a white heat in an open vessel, with free access of air. The lime thus obtained, should be slaked, and converted to a *hydrate*, and this again heated as before, when the whole of the carbonic acid will be expelled. Herein, I have followed the process of Professor Brande: and though few gardeners can be expected to act upon it practically, it is pleasant and profitable to become acquainted with the rationale of well-established facts.

Hot lime, and the hydrate prepared by slaking the shells with water before they become air-slaked by exposure, are of great importance in the farm: and its uses were particularly dwelt upon by the late Sir John Sinclair in "The Code of Agriculture." Many writers have attempted to elucidate its mode of action; and a very valuable article was a very few years since contributed to Science, by Professor Johnston of the late Chemico-Agricultural Laboratory of Edinburgh. The reader should be made thoroughly acquainted, in the first place, with the processes of slaking. If upon lime hot from the kiln, water be sprinkled in small quantities, great heat and steam are excited, the shells snap, crack, and crumble to a soft and bulky powder, which then is a true hydrate, containing one equivalent of water, and this water can again be expelled by heat. In such a hydrate there is no carbonic acid—it is still a caustic, alkaline lime. But lime is so greedy of water that, if it be exposed for a time to the air, it will equally, but more slowly, become slaked by attracting and uniting with the watery vapour of the atmosphere.

The powdery mass so produced is also a hydrate, but not purely and solely such, for lime not only attracts and fixes water, but exerts its chemical affinity for the carbonic acid, which also is always present in the air. Air-slaked lime, therefore, is more or less a carbonated hydrate, approaching somewhat to the nature of common chalk or whitening, and if a small quantity of it be dropped into a glass containing dilute muriatic acid, it will effervesce, and produce a beading of air-bubbles. In the garden, fresh made water hydrate, in fine powder, acts most effectually in the destruction of slugs and other vermin, and it may at all times be employed, with great safety, to vegetable crops, because its affinity for water is satisfied by the equivalent which it already contains, and therefore it does not injure the vegetable tissues, as hot and unslaked lime would do, by its eager attraction of moisture.

The destruction of inert, useless vegetable and animal matter, is one of the objects which the advocates of hot lime hope to effect. Sir Humphry Davy thus expressed his view of the subject: "When lime, whether freshly burnt or slaked, is mixed with any moist fibrous vegetable matter, there is a strong action between the lime and the vegetable matter, and they form a kind of compost together, of which a part is usually soluble in water. By this kind of operation, lime renders matter, which was before comparatively inert, nutritive, and as charcoal and oxygen abound in all vegetables, it becomes at the same time converted into carbonate of lime.

"Quick-lime, in being applied to land, tends to bring any hard vegetable substance that it contains, into a state of more rapid decomposition and solution, so as to render it a proper food for plants. Chalk and marl will only improve the texture of the soil, or its relation to absorption; it acts merely as one of its earthy ingredients.

"Quick-lime, when it becomes mild, operates in the same manner as chalk; but in the act of becoming mild, it prepares soluble out of insoluble matter."—7th *Agricultural Lecture.*

No one, until Mr. Rowlandson, of Liverpool, wrote his Essay on Lime, had, I believe, given a hint of that most essential property of lime, by which it becomes the specific reclaimer of inert peat bogs. Davy, without detecting the cause of this agency, had observed that lime was injurious when mixed with any common dung, and tended to render the extractive matter insoluble. Mr. Rowlandson asserted, and I have proved the correctness of his views, that if lime or lime-water be mixed with brown humus, black peat, old soil glutted with humic matter, it attracts and fixes the humic acid, and forms an insoluble humate of lime. Any gardener can try the experiment, and thus satisfy himself of two important facts. First, that humus, when superabounding, is a poison. Second, that lime is its specific antagonist. Thus it is shown, that the Scotch, and all reclaimers of peat bogs, act upon sound philosophical principle when they apply lime in comparatively immense quantities. Mr. Ruffin, U. S., told us long ago, that the reduced vegetable masses in America were quite inert until regenerated by *shell* marl; and therefore, he lamented the local absence of mineral chalk and limestone; he approached the truth practically, but failed to establish a clear and indisputable theory.

Having assumed new ground, upon the convincing arguments of Mr. Rowlandson, and on various occasions endeavoured to show that the chief object of liming is, or ought to be, the fixation of humic acid in a soil which is supersaturated with that inimitable produce of organic decay; it is now proper to request the attention of the young aspiring horticulturist to one or more simple processes, the result of which must, I imagine, be conclusive. In the first place, let him provide himself with three phials, containing an ounce or two of caustic potassa, caustic soda, each in solution, and pure liquor of ammonia. In three cups put a portion of brown heath-mould, old decayed wood, or black spit dung; on each pour as much boiling rain-water as will quite cover the soil; colour, more or less deep, will be extracted from all, but this colour will be made greatly deeper, by adding some drops of either of the three forenamed alkalies. The operator should vary the application till he satisfy himself on every point, and then note down the observed effects. The liquor from each cup should be pressed off through linen, and passed into separate tumblers or wine-glasses, and when clear, the intensity of the colour will demonstrate the specific solvent power of the particular alkali that has been used. Thus, there will be three distinct *humates*, one of *potassa*, one of *soda*, and the third of *ammonia;* all proving the important fact, that the three alkalies dissolve humic matter, and *hold* it in solution. In this stage of the processes, add a small teaspoonful of finely powdered quicklime to every glass, and stir the contents several times; after which, permit the separated matter to subside, when it will be seen that the colour has been discharged, and a flocky, brown sediment formed in considerable quantity; clear lime-water will also produce similar results.

Finally, as a converse, let the experiment with the three humous earths be varied, only substituting powdered lime, or strong lime-water, for the three alkalies, and it will appear that no colour is extracted, that it has been attracted and fixed, being deposited as an insoluble humate of lime. The more the experiments are varied the better; knowledge will be gained at every step, and proof conclusive will be established that lime acts as a corrector, and that its attractive affinity for redundant humid matter is paramount.

The compounds of Lime must be deferred till the next number.

INFLUENCE OF CLIMATE ON VEGETATION.

By Mr. Moore.

Meyer's table printed at p. 203, shows theoretically how the surface of the earth may be divided into zones from the equator to the poles, and into regions from the sea-level to the mountain-tops, in such a way, that these latitudinal and altitudinal divisions may be seen to bear respectively a certain relation to each other, the decrement of temperature in the two series being singularly parallel. Temperature, it is to be understood, is made prominent in these observations, not as being the only important element of climate, but as constituting the most ready index to those climatic conditions which principally affect the life and development of plants. This scheme of Meyer's points in a right direction, though, for the practical purposes of cultivation, it is too rigidly formal; the zones and regions being strictly confined within parallelisms of latitude and altitude.

The division of the surface of the globe on the basis of isothermal lines, seems, however, to admit of practical application as a means of assisting in the grouping of cultivated exotic plants into sections or divisions, which shall convey a more just and complete idea of their requirements in respect to artificial temperature, than is the case with the old groups to which the lumping terms of "stove" and "greenhouse" have so long been applied. In stretching out such a division, we are, as already observed, merely following the practice of intelligent cultivators who have long since found that two structures—two states of artificial climate—are totally inefficient towards the successful culture of those numberless exotic forms of vegetation which require a higher temperature than our climate naturally affords. Our aim is, that the fact thus acknowledged in practice, may also become fixed in the language of horticulture.

We set out by asserting that the two old divisions, "stove" and "greenhouse," are inadequate, and that more groups must be formed; but it is not necessary to carry the subdivision to an opposite and inconvenient extreme. Probably the formation of zones corresponding to every 10° of mean annual temperature above that of England, would indicate nearly all the divisions into which tender cultivated plants would require to be separated. Thus we shall have formed the following groups; the two latter of which would represent all subjects, hardy as respects temperature, in the southern and midland parts of Great Britain.

The Equatorial Group	=	Mean Temp.	80°—90°	Fah.
The Tropical and Sub-tropical Groups	=	„	70°—80°	„
The Warmer Temperate Group	=	„	60°—70°	„
The Temperate Group	=	„	50°—60°	„
The Sub-Temperate Group	=	„	40°—50°	„
The Polar Group	=	„	32°—40°	„

The Tropical and Sub-tropical Group would probably require sub-division.

Any scheme of this kind, it must be remembered, will be of necessity arbitrary, and liable to objections, which it may be expected will from time to time arise. Thus, at the outset, we find that the two last-named of the above groups represented by the range of mean temperature 32°—50°, and which are assumed to correspond to plants hardy in the climate of England, are, at the highest point, somewhat below the mean temperature assigned to London, which is 51°. This slight discrepancy will not however be found to materially affect the result; the temperate plants, represented by 50°—60°, not differing so much from those below them in requiring greater heat, as in their not enduring with impunity so considerable an amount of cold.

We shall now sketch out briefly the zones with which the above-named groups are intended to correspond, leaving altitude out of consideration for the present.

Mean Temp.: 80°—90°. The equatorial zone does not exactly correspond to the true equator. Commencing a circuit in the Pacific Ocean, it lies entirely on the southern side of the line, takes in the Galapagos group of Islands lying on the equator towards the American Coast, and then passing suddenly to the north of the line, takes in Panama, New Granada, Venezuela, and the Barbadoes group of Islands. Then turning northwards, it crosses the Atlantic, taking again a northerly direction, and including a portion of Africa entirely on the north of the line, its northern limit striking the African Coast about the 10° of lat. passing diagonally to 20°, and then extending nearly parallel with the equator to the Arabian shores in the Indian Ocean. In this tract is comprehended Guinea, Soudan, Nubia, Abyssinia, and the northern portion of Arabia with the Island of Socotra. The zone then crosses the Indian Ocean to the shores of India, where leaving Bombay to the north, it crosses the Bay of Bengal, taking in Madras, including also Ceylon. Here its southern boundary crosses the line, but so that it takes in the Malay Peninsula, and the Islands of the Eastern Archipelago, exclusive of Java and some other small Islands on the same parallel, together with a small slice of New Guinea in the southern hemisphere, and the Philippines in the northern.

Mean Temp.: 70°—80°. The northern tropical and subtropical zones take in the Sandwich Isles in the Pacific, whence their northern boundary crosses Lower California about Santa Margarita, then to Cingaloa on the Mexican coast across Mexico, taking in of course Guatemala, skirting the northern side of the Gulph of Mexico, and including Florida, with the islands of Cuba, Jamaica, Hayti, and the rest of the Bahamas and West Indian group. In the Atlantic they include the Cape de Verd group, which lie towards their southern, and the Madeira group, near their northern limit; then crossing Africa, they take in Senegambia, the Great Sahara, Egypt, Arabia, Persia, the remaining part of Hindoostan, Birmah, Siam, Tonquin, and as far north as Fou-tchou, in China, together with the Island of Formosa, the Philippines, and the Marianne Isles.

The southern tropical and sub-tropical zones comprehend the New Hebrides, New Caledonia, and the Polynesian group in the Pacific Ocean; a broad slice of the South American continent, including Equador, Guiana, Peru, the principal part of Bolivia, part of Paraguay, Brazil; then Trinidad, Ascension, and St. Helena in the Atlantic; Congo, Benguela, Bechnana, Natal, Mozambique, and Zanzibar in Africa; the Islands of Madagascar, Mauritius, Bourbon, Java, Timor, &c., in the Indian Ocean; the southern point of New Guinea, and the northern half of Australia, the boundary line traversing a little to the south of the Tropic of Capricorn, setting in about Shark's Bay, and running out nearly opposite Sandy Islands.

Mean Temp.: 60°—70°. The northern warmer temperate zone extends along the coast of the Pacific to Monterey, in Upper California, taking in Lower California, the remaining northern part of Mexico, Texas, the southern States of America, following about the 36° of lat.; then crossing the Atlantic it takes in the Azores and the Canaries; Morocco, Algiers, and Tunis on the African coast; the greater part of Spain and Portugal on the opposite European coast; Corsica, Sardinia, Sicily, Italy, Asia Minor, Thibet, and China, of the latter country, including the coast line from about Fou-tchou to the 35° of lat. beyond the mouth of the Yellow River.

The southern warmer temperate zone does not include much land. On the South American continent it takes in the Pacific coast from about the 18° to 30° of lat., and stretches across the southern part of Bolivia, part of Chili, southwards to Coquimbo, including La Plata and Paraguay, and taking in the southernmost point of Brazil, including on the Atlantic coast, from about the 25° to the 38° of lat. In Africa it takes in the Cape Colony; then passing to Australia, it takes in the southern half of that country, including the settlements of West and South Australia and New South Wales; Norfolk Island, and about half the northern Island of New Zealand, from the Bay of Isles to the Bay of Plenty.

Mean Temp.: 50°—60°. This indicates what we have called the temperate zone. The northern zone takes in the northern part of California not before included, and the bulk of the United States, including a portion of Lake Michigan, but excluding Oregon on the Pacific side, and New York on the Atlantic side. In Europe it includes nearly all Ireland, England as far north as York, France, Germany, Austria, Turkey, a point of the Russian Empire between the Black and Caspian Seas; in Asia, Tartary, the northern part of China, part of Mongolia and Mandchouria, Corea, and Niphon, the principal island of Japan.

The southern zone comprehends Chili and Chiloe, part of Patagonia southwards to the Gulph of St. George; Van Diemen's Land, and nearly all the remaining part of New Zealand.

Mean Temp:. 40°—50°, and 32°—40°. Northwards these zones comprise the north-west coast of America, Canada, Labrador, Newfoundland, Scotland, Iceland, Norway, Sweden, Lapland, Friesland, Russia, Western Siberia, Mongolia, &c.

Southwards it includes Patagonia—the remaining part, Terra del Fuego, Falkland Isles, Kerguelen's Land; Auckland's, Campbell's, and some other islands.

The foregoing divisions refer only to latitude; but the results are materially altered by taking altitude into consideration. A greater or less distance from the equator, is coincident with a higher or lower degree of temperature; and a greater or less degree of elevation is also found coincident with a higher or lower temperature. The exact and detailed distribution of plants into groups requiring a certain mean annual temperature, becomes therefore a compound calculation, which the limits of these remarks cannot include.

It is found, however, that the decrease of temperature from the sea-level, or from the plains to the snow-line, is sufficient, constant, and uniform to admit of approximate, if not of exact calculation. Presuming on the correctness of Meyer's data as a basis, we shall now attempt to divide the altitudinal range into regions, corresponding to the isothermal latitudinal zones already sketched out; this division indicates a rise of 3040 feet for a decrease of 10° mean temperature, as is more clearly shown in the annexed table:—

Zones =			Equatorial.		Tropical and Sub-tropical.		Warmer Temperate.		Temperate.		Sub-temperate.		Polar.
Mean Temp. =			85°	80°	75°	70°	65°	60°	55°	50°	45°	40°	32°
			Alt. ft.	Alt. ft.	Alt. ft.	Alt. ft.	Alt. ft.	Alt. ft.	Alt. ft.	Alt. ft.	Alt. ft.	Alt. ft.	Alt. ft.
Polar	32°	.	15200	13680	12160	10640	9120	7600	6080	4560	3040	1520	0
	40°	.	13680	12160	10640	9120	7600	6080	4560	3040	1520	0	
Sub-Temp.	45°	.	12160	10640	9120	7600	6080	4560	3040	1520	0		
	50°	.	10640	9120	7600	6080	4560	3040	1520	0			
Temperate	55°	.	9120	7600	6080	4560	3040	1520	0				
	60°	.	7600	6080	4560	3040	1520	0					
Warmer Temperate	65°	.	6080	4560	3040	1520	0						
	70°	.	4560	3040	1520	0							
Tropical and Sub-Tropical	75°	.	3040	1520	0								
	80°	.	1520	0									
Equatorial	85°	.	0										

This table is, of course, arbitrary; but a few illustrations will show that it approximates to the truth. Thus, for example:—Bogota, in New Grenada, lies within the parallels of 80°—85° mean annual temperature, and has an elevation of 8100 feet; in the column headed 85°, 7600 feet (which is within 500 feet of the altitude of Bogota), will be found to range opposite to 60° in the left-hand column of temperatures; the mean annual temperature of Bogota is recorded to be 59° +.

Kandy, in Ceylon, lies about the parallel 80° mean annual temperature, and has an elevation of 1790; in the table under 80°, 1520 feet, (the nearest to 1790) stands opposite 75°; while the mean annual temperature of Kandy is actually 72° +.

Darjeeling, in the East Indies, lies within the parallel of 72°—75° mean annual temperature, and has an elevation of 7414. The table shows 50°, opposite to 7600 feet in the column headed 75°; the recorded mean annual temperature of Darjeeling being 56°.

Perth, in Western Australia, lies within the parallels of 65°—70° mean annual temperature; and being unaffected by altitude, we find the actual mean annual temperature of Perth to be 67° +. What *cool* treatment we give our Swan River plants!

Funchal, in Madeira, lies within the parallel of 55°—68° mean annual temperature and is 80 feet above the sea; in the table 65° is found opposite 0° in the column headed 65°: the mean annual temperature of Funchal being 67° +.

Neufchatel, in Switzerland, lies about the parallel 55° mean annual temperature, and has an elevation of 1438 feet. The table shows 50° opposite 1520 feet in the column headed 55°; the mean temperature of Neufchatel being 51° +.

Ætna, in Sicily, lies about the parallel 65° mean annual temperature, and has an elevation of 9807 feet. In the table, 9120, under 65°, is seen to indicate 32°; while the mean annual temperature of Ætna, 700 feet higher, is actually 29° +.

It is thus pretty evident, that with the aid of a map of isothermal lines,* and a table constructed on some such plan as the foregoing, it would be easy to arrive at an approximate knowledge of the mean annual temperature of any part of the globe, if its elevation be known; and consequently, any person receiving seeds or plants from foreign parts, if informed of the country whence they come, and the elevation, might by an easy process, learn what it is most material to know, as to the artificial temperature proper for their cultivation.

But, in order to show that Botanical Geography is no trifling or simple study, it may be mentioned that the same species of plant is in the majority of cases distributed over a greater or less extent of the earth's surface; and may be thus found in positions where both the annual mean temperature and the altitude are materially different. To judge, therefore, what temperature is *best* suited for any given plant, it is necessary to know within what limits it is thus naturally dispersed, and its geographical range having been ascertained, the climatic differences indicated (if any) must be duly balanced.

There are many other matters to be taken into account in estimating the influences of climate on vegetation. Some of the principal of these are—sun-light, density or rarefaction of the atmosphere, and moisture. The two first are in a measure uncontrollable by cultivators; and hence arises many of the difficulties of cultivation, as well as many of its failures. There are items, however, in the sum total of the climate of particular places, which it is important to know, in order to imitate them as far as may be possible. With moisture it is different; this may be limited or increased, and that to such an extent, that moisture and temperature are verily looked upon, in no paucity of instances, as the only elements of climate.

The cultural groups indicated in the former part of these remarks were founded on temperature alone. Taking moisture, also, into account, most of these groups will require dividing into two to suit the purposes of the cultivator, according as the plants require a greater or less degree of atmospheric moisture. This is not merely the case with those plants on the one hand, which require an arid atmosphere; and on the other, those which prefer it almost at the point of saturation. The former conditions, indeed, apply for a greater part of the year, to the race of vegetables called succulents; and the latter in an especial degree to the races of Orchids and Ferns. But besides these cases, a variation in the amount of atmospheric moisture is requisite at different periods of the growth of every plant; and if one structure of a given temperature is to be kept constantly filled with plants in a state of growth, another must or ought to be provided for the same races in a state of rest, when different conditions both as to temperature and moisture are essential to their well-being. What kind of structure is best suited to plants in this state of rest, we have not space here to inquire. We only maintain that the atmospheric conditions must be different from those to which the same plants are subjected while in a state of growth.

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* Such a map, on a small scale, is published in Part VI. of the "Physical Atlas," small edition. London and Edinburgh, Blackwood.

FLORICULTURE.

By Mr. Dickson, Florist, Brixton Hill.

The Yellow Picotee. I have more than ordinary pleasure in inviting the attention of amateur florists to a consideration of the claims of the above beautiful race of flowers. Fashion is said to exercise an almost iron rule among her votaries; how far this may be the truth in some particular cases I will not take upon myself to determine, but proceed to prove that in the matter in hand her mandates are not arbitrary, seeing that the amateur is left free to choose whether he will increase his pleasures by adopting a flower that has received her sanction or not. It is enough to state that a few years since the Yellow Picotee was considered all but inadmissible to the amateur's collection; whether from its apparent want of attractions, or difficulty in developing such as it really did possess, I will not stop to inquire; in all probability a combination of causes contributed to produce the effects we are attempting to delineate. Be this as it may, it was not till a few seasons since, not more than two or three I think, that some enthusiastic florist amateur took the flower in hand, resolving to try the hitherto invincible prowess in combating against floricultural difficulties (and their numbers in the affair alluded to were rather formidable); but perseverance has achieved wonders, and, as the engagement is still being carried on with all that indefatiguable zeal which distinguishes our amateur florist, there can be no question but in time, this race of plants will boast as many beauties as the Carnation or White Ground Picotee, and in order to lend a helping hand to bring about such a desirable consummation, I beg to offer the following suggestions founded on mature consideration of the subject in all its bearings, and supported by long and successful practice. The original Picotee was but a sport of nature from the Carnation, with a deep serrated edge. The first variety was Davey's True Briton, from which, with these crosses, all the best varieties now in cultivation have been raised. As some argument has lately arisen as to the propriety of calling a Yellow Picotee after that name, some florists appearing to force the presumption that it ought to be called a Carnation, I shall briefly give my views of the subject, leaving it for my readers to judge of the solidity of my argument and form their own opinions on the same, by adopting or rejecting my ideas at their pleasure.

Florists have usually distinguished the Carnation by its broad foliage and striped, or as as it is more commonly designated, flaked blooms, and smooth edge. The Picotee, on the contrary, is recognisable by its narrow foliage, spotted edge, usually serrated; such as are not so, being greatly preferred. In self-coloured Carnations there are, it is true, many varieties of tint, besides reds; the first self was a flesh-colour, hence the name Carnation, derivable from the Latin substantive *carnis*, flesh; there are likewise purples, and several other shades. The Picotee (which derives its name from the French participle *piquettée*, pencilled) also occasionally runs to a self; but still florists find no difficulty in distinguishing such from the Carnation, when subject to the foregoing test, viz., the width of the foliage, and smooth or serrated edge. The first Yellow Picotee was raised in the Channel Islands, it had a deep serrated edge, and narrow foliage; but if a yellow self were to be raised now with broad foliage and smooth edges of the petals, it would be called a Yellow

Carnation, and very properly so, I think; consequently, the reverse must be styled a Picotee. As a conclusion to my remarks on this subject, may I be permitted to observe, that where Picotees are grown without Carnations—*and the race carried forward*—their seed *invariably* produces Picotees; but when Carnations and Picotees are grown together, the seed from either kinds have been found occasionally to produce both varieties; therefore, botanically speaking, these are one and the same thing. Having endeavoured to set this matter on a correct footing, I will proceed to suggest the best method of growing the particular class under consideration, and supply the names of a few of the best now in cultivation.

That there is some difficulty in blooming the Yellow Picotee, I will not deny; but, that it can be done, is certain, and in a tolerable degree of perfection too, as is fully evident by the attempts made during even the last season, the most memorable perhaps to the lovers of Yellow Picotees that has occurred. The Dutch Florist can never manage this flower as it should be; arguing from this fact, that a damp or humid atmosphere is prejudicial to it, I have tried them in a moderately dry situation, and found them prosper; the flower evinces a decided dislike to be over saturated; and when kept in frames during the winter, it should be allowed to occupy the front rows of the back part, as being the driest and most airy: this treatment will almost insure sound plants, when if a contrary system be adopted, such as placing them in rather damp situations, and over-watering them, if it does not positively kill them, they will become unhealthy and unsound, and consequently quite unable to carry their bloom. The compost I generally grow them in, is, two parts good loam, two parts horse-dung, two parts leaf-mould, one part silver sand, and a little gypsum finely pulverised. In all other respects I treat the same as a White Ground Picotee or Carnation, excepting just in blooming time, when it will be found needful to shade it, or the brilliant yellow, so much to be desired in this flower will degenerate into a creamy white, and dullish yellow. For the growth of such plants as are considered desirable in their marking, and brilliant in their ground colour, I use two barrows of light loam, one ditto of leaf-mould, one ditto of old dung from a cucumber or melon-frame, one-half ditto old cow-dung, one-quarter ditto of river sand; but the former will be found best suitable, I think, to the general stock, the more especially if it comprises seedlings.

I always endeavour that my Yellow Picotees shall feel the sun's influence, though I prevent his rays from reaching them too suddenly; it does not answer to deprive them of a plentiful supply of air: I take any pot plant and place it in a situation in the grounds, where a free current of air can play about it (taking care that it is not too rough a day), and there let the sun shine *over* it, but not *on* it, shading by means of white calico caps, surmounted by a large green leaf of any kind, keeping up a very moderate supply of water; a flower bloomed in this way will give its owner a very fair opportunity of judging of its value. I propose this treatment for any individual seedling that may appear deserving of the trouble, when, if upon trial, it is found deserving of continual care, then it could be placed to the general collection and subject to the same course of treatment; an airy well-ventilated greenhouse answers very well to grow these plants in, but the mischief that too frequently occurs from adopting this method of protection is, that amateurs, in their over care, exclude the air that should be boldly admitted, and their plants die off. A few of the best varieties are as follows. I do not pledge myself to the *value* of the *whole* number as exhibitional flowers, but they are the *best* I know of, and until *better* can be found, I think myself fully justified in laying them before the readers of this magazine; the value I attach to them may be inferred from the manner in which they appear, the best proportioned taking precedence of the others. I must not neglect to observe that even the very best of this class are greatly inferior in point of property to the White ground Picotee or Carnation, but there exists good reason for supposing that they will ere long rival these deservedly popular favourites; I therefore respectfully intreat amateur florists to give them their countenance and support, when their ultimate perfection is certain:—Borand's Euphemia, Hoyle's Topaz, Willmer's Queen of Yellows, Mount Etna, May's Malay Chief, Countess of Ashburnham, Duchess of Normandy, George IV., Gipsy Queen, Merope, May's Parsee Bride, Martin's Queen Victoria, Brock's Queen, Remus, Romulus.

ON THE JUJUBE AS A FRUIT TREE.

Several species of plants belonging to the genus *Zizyphus* are known by the name of Jujube, but the two chief ones, so called, are *Zizyphus vulgaris*, the Common Jujube, and *Zizyphus Jujuba*, the Indian Jujube. The first of these is the common one, found in such abundance in the neighbourhood of Genoa, where it forms excellent fences on account of its thorns. This kind is the *Z. Jujube* of Mill. Dict., *Rhamnus Zizyphus* of Linn., and the *Z. sativa* of Desfontaines.

Z. Vulgaris forms a deciduous tree, growing to the height of 20 or 30 feet. *Bark* brown, and chapped. *Branches* numerous, pliant, armed with prickles, zigzag in their direction. *Prickles* at the joints, two, of unequal length, one somewhat curved and longer than the other, which is quite straight. *Leaves* alternate, oval-oblong, hard and leathery. *Flowers* small, axillary, pale yellow, with short peduncles. *Fruit* oval-oblong, resembling an olive, at first green, afterwards yellow, when quite ripe a deep rich red. *Pulp* fleshy, with a mild and vinous taste, having a very pleasant acid. *Seeds* two, inclosed in a nut having a long point or beak.

The plant is a native of Syria, whence it was introduced to Rome in the reign of Augustus, and from thence to England, in 1640. It also grows wild in several parts of Asia, in Greece, Portugal, and Sicily. It is extensively cultivated on the shores of the Mediterranean, and in various parts of Italy, as far north as Genoa. Pliny speaks of their ornamental appearance, and mentions their being planted on the ramparts of Rome. Du Hamel also recommends the tree to be generally cultivated on account of the beauty of its foliage. In the south of France flowers are produced in early summer, and then the fruit ripens in the beginning of Autumn; but in the neighbourhood of Paris the plant does not flower until the end of summer, and in consequence the fruit never comes to maturity.

The fruit, when dried, makes a pleasant sweetmeat, and a syrup of them is employed in abating fevers, purifying the blood, and as a remedy for coughs and colds; for the latter purpose, lozenges are prepared from the pulp.

The plant prefers rather a dry soil, and when once established will bear a considerable degree of cold. It requires, however, the temperature of a moderate greenhouse to grow it to perfection, and an increase of heat during the time of growth, that the wood may be fully developed and ripened.

Increase is effected by suckers, which are produced in abundance; and by cuttings of the roots taken from either young or old trees.

The Indian Jujube is the *Zizyphus Jujuba* of our Catalogues, and the *Rhamnus Jujuba* of Linn., Rumph., Rheed., and others. It is a native of India, and is extensively cultivated in China, and Cochin-China; forming in those countries a tree 16 or 18 feet in height and branchy, armed with twin prickles at the joints, one recurved and the other straight: the *Leaves* are obliquely-ovate, serrated, downy beneath, hoary. *Corymbs* axillary, almost sessile. *Flowers* greenish yellow. *Drupe* globular, size of a large cherry, but long, almost of the shape of the date, smooth, yellow when ripe, containing a two-celled one-sided nut.

In various parts of the East Indies there is another kind, called in Bengal *Narrikellekool*, which is probably only a variety of the *Z. Jujuba*, although the fruit is larger, being nearly the size of a hen's egg. The fruit is universally eaten, and esteemed, and is served up as a dried sweetmeat in Italy, and the plants are also grown there as hedges, in the same way as *Z. vulgaris*. The bark is thought to be useful in medicine. The temperature of the greenhouse and similar treatment to that given to *Z. vulgaris*, is all that is required.

ON THE CULTURE OF THE KAKI TREE.

The Kaki is the *Embryopteris Kaki* of our Botanical Catalogues, the *Diospyros Chinensis* of Blume, the *Diospyros Kaki* of Willdenow, and the *Kaki* or *Konis* of Kæmpfer. It is a native of Japan, China, and Cochin-China, and is extensively cultivated both in those countries and in many parts of the continent of India.

It forms an *evergreen shrub* growing 12 to 20 feet in height. *Branches*, tomentose. *Leaves* bifarious, ovate-elliptic, acuminate, cordate at the base, downy on both surfaces. *Male peduncles* usually three-flowered. *Male flowers, calyx* and *corolla* four-parted. *Stamens* sixteen to twenty-four. *Hermaphrodite flowers; Calyx* and *corolla* four-parted. *Stamens* eight. *Style* four-cleft. *Stigmas* bifid. *Fruit* globose, eight-celled, about the size of an orange, yellow when ripe, and replete with a rich, yellow, fleshy, tolerably pleasant pulp; in flavour, however, it is scarcely equal to a good apple, and it is said to be prejudicial if eaten to excess. In a dry state these fruit are introduced to this country under the name of Japanese Dates, and the sweetmeat known in France by the name of *Figues caques* is made of this fruit. They are preserved exactly in the same manner as figs, by sprinkling meal and sugar over them after they have been partially dried in the sun.

The plant forms a neat greenhouse plant and was introduced in 1789. It belongs to the Natural Order *Ebenaceæ*, or Ebony trees; its timber like that of the rest of the species is exceedingly hard and nearly black. Nothing more than the ordinary treatment of greenhouse plants is requisite, and increase is effected by layers and suckers.

ON THE CULTIVATION OF LOTUS JACOBÆUS AS A "SPECIMEN" PLANT.

By G. T.

In by-gone times, when the culture of ornamental exotics in private establishments almost universally resembled the objects, and assumed the appearance of public collections brought together in botanic gardens for the sake of science, for the numerical extent of genera and species they might contain; there is nothing very surprising in the circumstance of a plant so fragile, and at first sight so apparently insignificant in its external aspect as the dark-flowering old *Bird's-foot Trefoil*, being permitted to descend into comparative oblivion, until such time as some ardent admirer of "old plants" perceived the inherent attractions that it possessed, and accordingly set about *cultivating* his adopted plant, until at length a graceful "Specimen" was produced as the gratifying reward of all his pains. Thus we have presented forcibly to our more immediate notice, the now-a-days not unusual spectacle of some centenarian—some lowly and yet lovely plant that has been our unappreciated, if not despised guest for upwards of a hundred years—its delicacy and unassuming beauty perhaps unheeded, lightly esteemed if not altogether disregarded, or compelled in brief to "hide its diminished head" amid the gaudier hues displayed in the boundless realms of Flora.

Few, or rather none, we presume there are, who interested in the cultivation of plants, are wholly unacquainted with the neglected subject of our notice. As far as our own experience or recollection extends, its soft velvety-looking blossoms have ever commanded a certain amount of admiration—especially from the fair portion of amateurs, who although unacquainted with the more abstrusely scientific departments of the art, nevertheless delight and excel in the culture of subjects of ornament—whereas, the intrinsic merits of this plant, and its capabilities of becoming a "specimen" when well managed, have apparently remained disregarded until now. Here it may be appropriately mentioned that until we saw this old Leguminous plant in a beautiful state in the splendid gardens of the Earl de Grey at Wrest Park, Bedfordshire; we, too, were unconscious of how ornamental an appearance *Lotus jacobæus* might be induced to assume when submitted like *Pleroma elegans*, adverted to in a previous number, to "conditions essential to the most perfect cultivation" even under the well-known and skilful tendence of such a talented gardener as Mr. Snow. This trifling circumstance only serves to confirm what many concurrent and coincident ones have of late reminded us of more forcibly—namely, that undoubtedly the most striking mutations which horticulture with science as her basis, and theory and practice as her hand-maids, cordially together and hand in hand advancing, has undergone during the last quarter, consists in the gratifying triumphs that have been achieved by a combined effort of scientific and practical skilfulness over the now obsolete methods of other and less enlightened days—in the wide-spread amount of success that has resulted in the judicious appliance of observations intimately acquainted with practical cause and effect evinced in the bestowal of greater care and attention in the pot-culture of ornamental exotics.

Respecting the order *Fabaceæ*, or Leguminous plants collectively (of which the subject of our present allusions is but a lowly member), the talented editor of the "Vegetable Kingdom" truthfully observes, that "the Leguminous order is not only among the most extensive that are known, but also one of the most important to man, whether we consider the beauty of the numerous species which are among the gayest-coloured and most graceful plants of every region, or their applicability to a thousand useful purposes.

"The Cercis, which renders the gardens of Turkey resplendent with its myriads of purple flowers; the Acacia, not less valued for its airy foliage and elegant blossoms than for its hard and durable wood; the Braziletto, Logwood, and Rosewoods of commerce; the Laburnum; the classical Cytisus; the Furze and the Broom, both the pride of the otherwise dreary heaths of Europe; the Bean, the Pea, the Vetch, the Clover, the Trefoil, the Lucerne, all staple articles of culture by the farmer, are so many leguminous species." Nor is *Lotus jacobæus*, as was evidenced in the instance before us, one of the least attractive, though humble members of this vast family; for, belonging to the third or *Eulotus* section of the genus, the dark brown Papilionaceous flowers, are disposed in corymbose umbels, and produced in profusion over the whole surface of the plant, when well grown, the year throughout; indeed, such was the case with the specimen we saw of it at Wrest Park, and we were also much struck at the time with the pleasing appearance the foliage made, when contrasted with the velvety inflorescence with which the plant was bedecked from base to apex; in short, we saw in this creditably-managed young specimen an adequate illustration of what has doubtless been more or less generally recognised, even by the most unobservant, that there are plants we meet with now and then in a high state of cultivation, invested, as it were, with the highest degree of interest, and a corresponding amount of beauty of the most refined order; although the identical species which thus, through the medium of a masterly kind of culture, is endowed with a capability to arrest the attention of all beholders, may, by improper management or indiscriminate neglect on the other hand, not improbably be deemed utterly unworthy of our regard.

But to return to the consideration of its cultivation-proper, we will first observe, that a specimen pyramidically trained is apparently the most appropriate way to grow it, with a view to the full realisation of its natural habit and most characteristic features; for it must not be overlooked, that the ordinary condition it is to be met with in, would be a poor criterion as to how its growth should be directed, in order to exhibit as conspicuously as possible all the graceful elegance that it is susceptible of imparting when subjected to skilful treatment.

By what means, then, may a "specimen" character be realised approximating in all important respects the appearance of the solitary plant we have adverted to, as having been produced at Wrest Park? We may reply that these are points, which it is now proposed to investigate in detail, and efficaciously to do which, it will be advisable to date our observations from the period of propagation, which should be performed as early in the spring as suitable cuttings of the young suffruticose shoots are obtainable, when the usual course of insertion, in a compost of which fine sand is the chief ingredient, must be performed; but with respect to the application of moisture to the cuttings before the emission of roots takes place, considerable nicety must be observed, for although this be an old and well-known plant, it is by no means easy of multiplication, in consequence of the exceeding liability of the delicate wood to " damp off," unless the young cuttings are properly chosen, and water, as before observed, cautiously given, when plunged into the propagating bed.

When, sufficiently rooted, the young plants should either be potted singly, or if the immediate formation of the specimen be a desirable object, no less a number than three plants should be inserted collectively, *i. e.*, not disposed triangularly in the pot, but centrally, so as to present the appearance of being an individualised plant; but whichever plan it be deemed preferable to adopt, sixty-sized pots, and any light, free, well-drained compost will suffice for the first transference from the cutting pot, and should the potting be performed so early in the season as March, the young plants should then be placed to grow in an intermediate greenhouse, or rather warm pit, in close proximity to the glass for a month or two, in order that the advantages of full exposure to the light may be experienced; but at the same time, although freedom of growth be desirable, any tendency to become straggling must be obviated at once, by closely stopping back any shoots that are inclined to grow redundantly, as in the observance of this point whilst the plants are young, a degree of bushiness, or compactness of growth, is presently the result, and on the early attainment of which, much of the ultimate beauty and symmetry of a specimen will, as a matter of course, depend.

Should, however, the propagation, and, of consequence, the after-removal into separate pots be deferred until somewhat later in the spring than what has been previously hinted, there will, in that case, be no necessity for placing them to grow, when potted, in a warm house or pit, but rather an airy greenhouse or cold structure will prove the most appropriate situation, as being more conducive to the accomplishment of a sturdier and compacter growth; nor must, in either case, their progress be at all retarded by a longer confinement in small pots than is requisite for their establishment in them, inasmuch as a circumscribed habitude, in place of a free and comparatively luxuriant disposition of growth, would thus be precociously engendered; notwithstanding which, it would be an undesirable plan to transfer a plant of such slender growth into a full-sized specimen pot, which is, of course, one of considerable dimensions, for undoubtedly an intermediate removal into a medium sized pot would be preferable to the adoption of the " one shift system " in the case of so fragile a plant as *Lotus Jacobæus;* but for this first shift, the provision of a more substantial compost must be made, which may consist of nutritious loam as a base, partially commingled with decomposed leaf soil, a limited quantum of fresh fibrous peat, and an equal proportion of sharp sand; these ingredients must not, of course, be employed in a fine or sifted state, neither when commingled should the compost be so rough and porous as the rooting media usually prepared for robust New Holland plants, but in a tolerably medium condition of coarseness, just sufficient, by the aid of thorough bottom drainage, &c., to ensure an effectual state of porosity in the mass, inasmuch as any degree of stagnation of moisture in the compost would immediately become revealed in the sickliness of the plant it was destined healthily to support; and this shifting being performed, a light airy greenhouse will still be found the most eligible situation wherein to cultivate it, provided the stage or platform on which it is placed be sufficiently adjacent to the glass to prevent the possibility of etiolation of growth.

On the presumption that the specimen has become in some degree established after its secondary potting, and, moreover, that it is resolved upon the form of growth being pyramidically inclined, in preference to a more compact or " clumpish monotony" of habitude, sufficient attention must now, of course, be directed to the realisation of this object, which, in order to attain one (or if *three* plants as before suggested have been inserted instead of one, an equal number of leaders must of course be trained,) leading shoot must be centrally trained erect to a neat flower-stake, allowing at the same time the compact development of young wood already existing at the base of the specimen to elongate and grow *ad libitum*, and unchecked in future, unless, indeed, in the case of any unusually rampant shoot getting beyond the others, which, of course, must be checked in time, in order that they may profusely, and yet with a natural grace, depend over the rim of the pot, obviating, however, a tendency to flower at present by the timely removal of undeveloped blossoms, when a concentration of vigour in the specimen will, of course, be the resultant effect of the plant being prevented blooming yet awhile.

A final transference into a pot of good specimen size must now be thought about, ere the vigorous state of the specimen receive an undue check by becoming "pot-bound;" in the accomplishment of the final shift, the compost may this time be rendered somewhat rougher, and therefore more porous, by the addition of some turfy loam, and a little more sand, to the mixture previously employed; the drainage, likewise, being proportionately ample, and made more secure, by the inversion of a sixty-sized pot over the aperture of the larger one intended for the reception and growth of the specimen, the final potting performed with tolerable firmness, the ball, of course, being unbroken, and not too much depressed in its new position, a liberal watering may be given, and the plant placed in a cool pit for a week or so, until re-established, or, indeed, until the completion of its growth, should the period chance to be hot and dry, or if *vice versâ* to the latter, its primary site cannot well be improved upon; the watering part of its management, however, must now be carefully watched; for if allowed to become saturated at all—which, with sufficient drainage, it can scarcely be, provided the fluid appliances be judiciously managed—the evil consequences will soon be apparent; and thus, also, will it result if too inadequate a supply of water, in a dry and sunny period, be accorded, in which case denudation of the lowermost branches of the plant would inevitably ensue.

Henceforth the training must be conducted after the same plan as hitherto, *i. e.*, by directing perpendicularly the leading shoot (or shoots, if three plants), the stopping of which must be "few and far between," or the desired altitude of the specimen will not be attained—respecting which, however, the judgment of the culturist must, of course, be exercised, in order to counteract the nakedness or malformation of any part of it intervening the base and apex, when fully grown; nor need a rigorous stopping of lateral growth be performed, as a less formal and more graceful aspect will, of course, be obtained by permitting the side branchlets to grow with natural freedom, and yet, by skilful management, with such a degree of regularity as to compose an equal pyramid, and preserve the informal uniformity inseparable from plant culture, when brought about by a strict adherence to the rules of art.

In about eighteen months from the period of propagation, a most unique "specimen" may be produced; but as the subject of our notice is at best but a plant of very delicate constitution, a goodly reserve of young plants to form specimens, or, what would be preferable, several well-managed plants in various stages of development, should be kept on hand to meet casualties that with the best of cultivation will sometimes occur.

The home of *Lotus jacobæus* in winter is the greenhouse, where skilful treatment will preserve it throughout this season in the condition of an ever-green, but if at all neglected, or injudiciously treated by exposure to too much drought, or an over-due amount of moisture at the root or over-head, much of the soft wood, and its tender foliage, will be lost, if the plant does not perish altogether.

CULTURE OF PEACHES AND NECTARINES ON THE OPEN WALL.

By Robert Errington, Oulton Park, Oct., 1849.

Although the culture of the Peach and Nectarine has made some advance in later years in the gardens of our nobility and gentry, yet even there, the amount of perfection desirable and attainable, has not in general been consummated; whilst in the garden of the mere amateur, it is truly lamentable to witness the numerous failures; for could the latter succeed to his heart's desire, the Peach and Nectarine would be amongst the most important of his fruit trees. Important, because most of the luxuries and indulgencies of the latter class, must be obtained out of doors; and of all the out-door fruits, none give so apt an idea of tropical fruits and their peculiar flavour, as the Peach, Nectarine, and Apricot.

I am not without hopes, however, of living to see the day, when Peach and Nectarine culture will be universally established on an economical, and safe foundation. Economical, for although it is not in the amount expended in the preparation of the soil in which success is based, yet many are deterred from the culture of these noble fruits from an idea that it is of a complicated, and, by consequence, expensive character; as also in proportion necessarily uncertain.

Now, the only *really* expensive part of the proceedure is the walls; these are indeed somewhat costly, but as such generally exist, or are considered necessary as a principle of safety around most gardens of any importance, the expense of the walls as bearing on Peach culture falls to the ground. As to what has been termed border-making, I hope to show before I conclude the remarks I have to offer, that such as they have in the main been hitherto constructed—have been, to use a mild phrase, mere works of supererogation. They have, however, been something more; they have been exhaustions of rich pasture lands all over the country, and I need scarcely add, by such means have dipped rather too deep into the pocket of the proprietor. It must not here be supposed that I am going to repudiate the benefits derived from the use of fine loamy soils, by no means; I advocate its use in preference to all other composts, but at the same time, I protest against that expensive thing ycleped a border, in which there is ordinarily buried about ten times the amount of compost necessary for the wants of the tree; and which becomes in many cases a most fertile source of failure, from the circumstance of producing a too powerful root-action, which is decidedly inimical to the ripening of the wood; and which latter principle, is indeed the foundation stone of all trees acclimatising, on which the culture of the Peach and Nectarine ought assuredly to be based.

The present summer has been, I believe, notorious for inferior crops of wall Peaches and Nectarines; and I have no hesitation in asserting, that at least one half the failure has been occasioned by the immature state of the wood.

I am of course perfectly aware that the shoots of 1848 were not unusually ill ripened; what I mean is, that badly matured wood, which may possibly set and produce inferior fruit in any genial spring, will quail before such April frosts as we experienced this spring; when even thoroughly ripened shoots, with covering to boot, could scarcely withstand the severity of that period.

It is of no use to suppose that coverings alone caused the difference in setting in different gardens: it will be found on examination, that some trees set their blossoms, better without covering, than others with it. Let it not, however, be imagined that I would object to coverings; on the contrary, I would have them universally adopted, having long since proved their utility. What I here point to is, the degree of maturity in the wood, on which in the main the setting depends; for as the most genial spring cannot insure a healthy "set" with immature wood, so not even the most ungenial one does even totally destroy the blossoms of that which is thoroughly ripened, providing some little attention be paid to protection matters, which we also freely allot to those of an immature character.

I have a wall of Peaches of very considerable length, which have produced as fine a crop this summer, as in any previous year. These trees have astonished many gardeners, who have looked over them. The general exclamation has been:—What a fine peach wall; a full crop too! Why how have you managed to get a crop, you are the only one I know who has one out-doors? Such has been the gist of the remarks from several persons, and such led of course to some arguments, pro and con, on the subject of shallow borders, night covering, stopping, &c. &c. I have trees moreover which surprise as much by the regularity and evenness of their wood, or, in other words, the symmetry of the tree, and the equalisation of the crop: the latter effected in the main by summer stopping.

Having now sufficiently praised the trees under my charge, and complained of the present position of Peach and Nectarine trees in general; I may be expected to throw out some suggestions which will at once be preferable to recognised principles, and bear also the severe test of long experience; such I am indeed prepared to do.

Soils and Subsoils.—Everybody knows that unctuous, but not adhesive, loam is the soil for the Peach and Nectarine. Such soils are not to be met with everywhere: they may, nevertheless, be imitated in cases of necessity. Subsoils have as much to do with the fate of the Peach and Nectarine as even the soil—or, at least, are but second in import. Thus a border may be formed on an impervious substratum of clay or marl, the surface of which is a dead level, or nearly so. Rubble or bricks may be placed on this, and, it may be, a drain in front: nevertheless, "while the grass grows the horse starves;" and here, in extremely wet periods, before the superfluous waters can escape, the soil about the tender fibres is at the point of saturation. It should always be borne in mind that, even where the incline beneath the rubble stratum is considerable, a continual tendency exists at the outer margin of the incline to tilt up; for humus and other matters, escaping through disintegrations, are continually making their way, through the conjoint influences of descending moisture and gravitation; and being out of the "ken" of ordinary calculation, accumulate, in many cases, much faster than may be imagined.

The fair inference from these positions, then, is that the inclining surface of the subsoil should, in most cases, be considerable, in order that the impetus arising from water gravitation should be of sufficient power, at all times, to keep a clear course.

These preliminaries bring me, as I wished, to a recommendation of what I have called the "platform" system of planting. In the Auctarium of Mr. Maund, botanist and fruitist, the practice is fully described; but as very many persons do not subscribe to that work, I would, as a part of the present subject, beg leave to refer to it here. I have before stated that I consider a very great waste has occurred in the making of borders, as practised in former days, when the only notion entertained was, that a whole border of some 12 or 15 feet in width, must, of necessity, be made at once. This I hold to be by no means the case, for it is a waste of both materials and labour; and this I have proved for many years.

By platforms, then, I mean the forming a station, or plot, some six or eight feet square, instead of improving or attempting to alter the staple of the whole border.

This of itself is no small matter (as to the economical bearing of the affair) to the amateur, or those who do not possess the facilities offered in our larger garden establishments in Britain. Nevertheless, let it be understood that where the subsoil is of a retentive character, a *general drainage* of the whole border is requisite, previous to forming the platform. Such, then, being accomplished, and "the stations" marked out, the original soil for about six or eight feet square must be completely excavated to the depth of about thirty inches. The surface of the subsoil should be sloped from the wall considerably, and if any danger from water exists, a straight drain at right angles with the wall should issue from the bottom of each excavation, leading directly into a main, which in all cases should run parallel with the wall at the edge of the border next the walk. I before stated thirty inches as the depth of the excavation; my practice is then to place ten inches of rubble, stone, bricks, clinkers, or other imperishable materials, in the bottom of the excavation, thus leaving twenty inches for a pure maiden soil or compost.

I am, of course, now speaking with regard to Peach and Nectarine culture. Now for soil or compost. As before observed, a good, sound, mellow loam is the prime material, such as our nurserymen select for general potting purposes, and the more coarse herbage with it the better. I generally blend some half-decomposed leaves with the mass, the amount of these depending on the amount of organic matter in the soil. When the loam is more adhesive than I desire, I introduce new straw in layers all through the mass; this serves to keep the compost elastic until the young tree is fully established. Manure, if used at all, should be used with a sparing hand, and when I use any, it is fresh manure from the stable door; this decomposes slowly, and, consequently, endures the longer.

Now by the practice here described, it will be seen that some five or six barrows of the loam is abundantly sufficient for any wall tree; whereas, by the old mode of what is termed "border making," nearly as many cartloads are required. I have trees thus planted, which ripen their wood as thoroughly every year as trees in Peach-houses; and as for gum, it is seldom or ever seen: neither does a single shoot ever perish at the point by this system of culture. I must, however, whilst on this part of the subject, name what I consider another adjunct of good culture, viz., a judicious course of stopping. My practice is to pinch or stop all through the summer, wherever any necessity exists, commencing with the "gourmands," or over-gross young shoots, in the end of May, and continuing to stop almost weekly some or other of the coarser shoots, commencing chiefly with the upper portions of the tree, and working downwards; the lower, and inferior or weak portions, I leave growing until the last. This is the true way to equalise the sap, which some think to accomplish by winter pruning and fanciful forms of training, both which involve a considerable amount of labour, and generally end in disappointment.

A person who had not fully considered the question of the ripening of the wood, would be astonished at beholding the vast difference existing, in the months of September or October, between a Peach planted in very deep and very rich soil, and one placed under the control here pointed out; the one still rambling away, and producing numberless axillary shoots, and appearing as though it wanted two months more of summer; the other arrived at a total cessation of growth, and, although less robust, possessing already plump buds on firm, short-jointed wood. The difference, moreover, becomes again manifest beneath the knife of the pruner, the one cutting like our hard-wooded trees, the other much like a Raspberry cane.

One of the most important features connected with this mode of culture (and to which I would respectfully direct the attention of the peach grower), is the perfect control under which trees thus circumstanced are placed, together with the systematic mode of cropping on the borders, and which becomes quite compatible with a perfect system of tree culture.

In thus appropriating a border to Peaches or other trees on the platform mode, I always devote at least four feet next the wall to what I term "root culture;" that is to say, such space belongs exclusively to the fruit-tree roots, and may either remain idle, or receive top-dressings or mulchings, as the case may require. As a general principle, however, in small gardens, I would advise some compromise; one yard would suffice, avoiding all cropping opposite the platforms or station. Vegetables, therefore, may be cropped, and the ground dug deep for the first two years after planting, to within a yard of the wall; and my advice and practice is, that about six inches be relinquished every year afterwards, until a clear space of five feet be left next the wall; this, of course, would occur in four years after planting, by which period the trees would be nearly covering the spaces allotted to them, and would then require the whole volume of soil between the wall and the limits assigned, for their surface-roots to spread and ramify in.

The rest of the border may henceforth be dug deep and cropped to within this distance, for it is no injury to the trees to cut away what fibres extend beyond this line; and thus the root culture of the trees and vegetable cropping may be made compatible, and both carried out in the utmost perfection.

This five feet will present ample space to carry out a top-dressing, which I ought to have stated before, is a necessary adjunct of this system. I need scarcely remark here, that it is one thing to mix dung or other gross manures with the volume of the soil, and another to place a coating on the surface of the border annually; or, in other words, it is one thing to gorge a tree whether in want or not, and another to present food as its needs require.

By the mode of planting here recommended, it will be found that the trees, after being planted some four or five years, will both require and enjoy a top-dressing every June or July, as the case may be.

My practice is to permit the ground to become fairly warmed with solar heat before applying my annual coating or top-dressing. I moreover suffer the ground to become somewhat dry, and if it cracks slightly, so much the better; for by this I am assured the atmosphere has penetrated the whole volume freely. Now this is generally the case a little before the fruit commence their last swelling—say in the early part of July. It may here be remarked, however, that when the case is very severe, top-dressing must be applied much earlier, and this may be determined by the character of the young wood, which will of course point out the amount of vigour in the tree.

The mulching then being applied under these circumstances, I invariably seize the chance of giving the trees one thorough soaking of water; indeed for my long wall I generally employ three men carrying water for nearly half a day, for I regard one thorough saturation of the soil of much greater import than several slight waterings.

I ought here to observe, that I suffer the newly-applied mulch to become heated with the sun's rays before I apply the water, and this I always endeavour to do on a sunny day, when the mulch is heated with the sun's rays.

It is truly astonishing to witness the vigour imparted to the trees under the above circumstances, and all the robbers, or gross shoots, having been stopped previously to the application, an impulse is given to the lower and inferior parts of the tree, which I regard of the utmost benefit. The powerful root action hitherto excited by the growing principle in the superior parts, being now rendered available to the augmentation of those which are in a weaker condition, especially those at the bottom of the wall.

In removing large limbs from Peach and Nectarine trees, when such amputation becomes necessary, it is particularly essential that some material be employed to cicatrise the wound; for no tree is more impatient of amputation than these. Some use grafting wax; others paint the wound over, or rather, I might say, apply a coating of white lead to it: for my part, I have generally used a mixture of lime, cow-dung, and strong clay, well kneaded together, putting a screen of cloth or linen over the whole, to prevent rifting.

On no account, however, should limbs more than two years old be removed, unless in cases of sheer necessity; it is better to be content with a branch which possesses but few shoots, than to cut it away. However, cases will arise in which an operation of the kind must be performed. Operations such as this should be anticipated: the finger and thumb applied judiciously, in a timely way, will, for the most part, supersede the bill-hook and the saw.

It is a common complaint that the Peach is short-lived, and there appears much reason for it. Those, however, who make use of the privilege so freely accorded of visiting the magnificent seat of Chatsworth, the residence of his Grace the Duke of Devonshire, will feel compelled to revise their pre-conceived notions in this respect. I had the pleasure, a short time since, of doing so; and although I have in my time been accustomed to see fine Peach trees, I could scarcely have conceived it possible for any amount of horticultural skill to have preserved so long, and in such splendid condition, so noble a Peach tree as at this moment exists in one of the houses there. The exact measurement of this extraordinary Peach tree I did not inquire, and I lament the omission.*

The tree appears to be of some twenty or thirty years' standing, and its huge arms extend right and left over a space which, under ordinary circumstances, would require half-a-dozen trees to cover. It has borne most remarkable crops, as I was informed; and no wonder, for the young wood appears as if disposed by a mathematical precision, and, I may add, about equal in strength in all parts of the tree.

Judging from its present appearance, this noble tree is likely to endure some half-score years longer, and I must confess that I never saw, in any tree, so triumphant a refutation of the idea of a Peach tree being necessarily short-lived.

To conclude my long remarks, I may observe that no maxims of planting, training, pruning, or stopping, will prove of any avail, if insects be permitted to ravage the leaves of the Peach and Nectarine. No tree suffers sooner from such depredators. This, however, is a wide question, and may form the subject of some future remarks.

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* "We visited besides four large Pine-houses, one Strawberry and Cherry-house, and Peach-houses—one of which contains the finest 'Royal George' Peach tree in the kingdom, the branches extending 70 feet in width, and the height from 17 to 20 feet, and of the most perfect symmetry. In 1842, *seventy dozen fruit* were obtained from it."—*From the "Description of Buxton, Chatsworth, and Castleton, Abridged from Adam's Gem of the Peak*, 1847."

ON THE ROTATION MANAGEMENT OF CROPS IN VEGETABLE FORCING STRUCTURES, &c.

By G. T.

"Every department of gardening has objects or final results peculiar to itself, and the main beauty of each of these departments will consist in the perfection with which these results are obtained." Thus truthfully wrote one of the most philanthropic friends of gardening and gardeners—the immortal Loudon—we say truthfully wrote, because every gardener imbued with a love of order and economy in the exercise of his profession will so appreciate it, whereas, those who "care for none of these things," and consequently deny any pretension to such qualifications, will unflinchingly treat as a chimera the quotation we have selected. Be this as it may, however, it is a palpable fact that the luxurious requirements of our employers have increased to a multitudinous extent, and, of consequence, the duties of the gardeners themselves in a corresponding ratio during the first half of the current century.

Time was, and the period not a remote one, when the winter acceleration of vegetables was looked upon as a luxury and a delicacy, in lieu of being regarded as it has now become the case, a common-place necessity.

Forced Asparagus, New Potatoes, Early Rhubarb, French Beans, Young Carrots and Radishes, Mushrooms, Forced Sea Kale, Pot-herbs and Sweet-herbs, &c., in a green state. were, in times gone by, considered as luxurious delicacies of the hyemal season, whilst a handsome young cucumber produced at table, or seen depending from the hothouse roof on Christmas Day, when nought save a transparent barrier of glass intervened between its verdure and the snow, was deemed a downright prodigy at one time; but, in these latter times, all those enumerated, and much more in addition, must be "supplied on demand;" they are indispensable requisites now, and the ingenuity and energies of gardeners must alike be unceasingly directed to their attainment, in order to comply with the demands of fastidious affluence and fashionable expectation.

It would not be altogether irrelevant to the present subject to attempt a discussion of the important question, as to whether the means generally placed at the gardener's command for the artificial production of vegetables on an extensive scale, are so extensively adequate to the requirements of such cases as they ought to be; we believe they are not, but, nevertheless, do not now contemplate entering into this part of the subject, rather intending to observe, now that the opportune season for doing so has arrived, on the general routine of practice to be adopted under existing circumstances; and, notwithstanding, that much, very much, remains to be done for the more advantageous forcing of delicate vegetables in winter, it will not be controverted that much more than is usually performed, also remains to be accomplished by the measures even now at our disposal.

How frequently, for example, may we not observe long ranges of forcing pits and structures of the kind, (whether heated by the agency of fermented substances, or by that of hot-water tanks and pipes, it is immaterial for the moment to consider,) remaining unemployed for months together, at the precise season when they should be stored with suitable winter vegetables in abundance; the crops that are more immediately to be deemed the productions of summer suns, as Melons, Cucumbers, &c., no longer occupying them, the work of these structures in too many instances is for the season accomplished, until revivified by the busy rendering influence of returning spring.

Nor let it be supposed that this descriptive state of things is applicable to, or known to occur, but in establishments where the non-residence or non-requirements of the family in the winter season would render such productions superfluous; for if such were the case, the bestowal of extra labour, expense, and care upon them would be uncalled for, but, on the contrary, no inconsiderable plurality of instances might be adduced, where ways and means such as we have already alluded to, exist extensively, and yet the various "delicacies of the season," though they be much in demand, are not always found forthcoming in sufficient plenty.

If any advantage could accrue from the further pursuit of our subject in this manner, abundant materials are extant wherewith to pursue it, but convinced of the inutility of such a course, and moreover, that so far from any material good arising, considerable harm might perhaps result from following it up, we will dismiss the allusions that have been already directed with this observation, in justification of what has been now advanced, namely; that the interests of employer and employed are alike so intimately blended, and so equally involved in the importance of allowing ample means for the obtainment of all the desiderata appertaining to an extensive establishment, and the most equitable and economical disposition and employment of those means when allowed, that any inefficiency or neglect of them must of consequence engender disappointment and all its attendant results.

Where a range or ranges of vegetable forcing structures exist, there should properly be no cessation of employment for them the year throughout; they *may* advantageously, and therefore they *should*, unceasingly be occupied, and if the occupation of them is conducted judiciously and with wonted forethought, even though these structures for the acceleration of vegetables derive, as in the majority of cases we presume to be the case, their calorific medium from the somewhat uncertain agency of fermenting materials, one crop may be brought forward to prepare the way for a successional crop of a very different kind; late Melons, for instance, may thus succeed early Cucumbers; French Beans succeed late Melons; Asparagus follow French Beans; after Asparagus, Rhubarb may be introduced; Sea Kale next in order, and finally, secondary crops of Melons or Cucumbers in succession.

Presuming all the while, that forcing accommodation is on an appropriately extensive scale, another rotation plan would be, to produce a crop of early Horn Carrots (with interseminations of short-top Radishes) after late Cucumbers, then Asparagus, and to follow the latter, a secondary crop of Melons; to be followed by a secondary crop of forced French Beans, Sea Kale being made to come after the Bean crop; concluding the round with Cucumbers or Melons. A third rotation may be performed as follows, viz.: to succeed the latest Melon crop in November, a crop of Potatoes; Rhubarb or Asparagus to follow; then sweet herbs, as Basil, Marjoram, &c., and to conclude with a successional Cucumber crop.

For a fourth succession of vegetables, Asparagus first; next Potatoes; then Early Stone, or Dutch Turnips intersown with Turnip Radishes: Chilies to follow, after which winter Cucumbers.

A fifth rotation might advantageously be accomplished thus; after late Melons or Cucumbers, a crop of Dwarf Peas; then Rhubarb, Asparagus, or Sea Kale; after which a secondary crop of Horn Carrots or Stone Turnips, always interdrilling carrots and turnips with Short-top and Turnip Radishes respectively, and of course on all occasions completing the round with Cucumbers, Melons, Chilies, &c.

Perform a sixth rotation with either French Beans, Early Potatoes, Carrots or Asparagus, after Chilies are ripe in Autumn, to be followed by the earliest Melon crop; late Cucumbers being next in order. To pursue the systematic rotation of crops in detail to greater length, would be unattended with practical utility, or what is worse, have a tendency to perplex the uninitiated who may happen to peruse the foregoing general hints; it will rather be of more use, and still suffice to observe, that the successional arrangement of crops of vegetables under glass being almost inexhaustible when well carried out, may be made *ad libitum* to any extent that existing means will permit of doing, and it is almost needless to observe, of course so arranged as to comply with the particular tastes and requirements of particular families, thus: Asparagus, Sea Kale, or Rhubarb, may happen to be vegetables especially in demand, forced Asparagus probably to a greater extent than any other vegetable at that season of the year, and it will be obvious to the practical culturist there can be no difficulty in existence in obtaining half-a-dozen or more successions of such vegetables, alternating with each other by means of the same structures. As there are several minor matters, however, which it is requisite to make incidental allusion to, we shall, in our next number, briefly refer to the winter protection and acceleration of various salading, as Endive, Lettuce, Mustard and Cress, &c.

(To be Continued.)

GOETHE'S ESSAY ON THE METAMORPHOSIS OF PLANTS.

(*Translated from the German by* Edward Ortgies.)

> "Lo, he goeth by me, and I see him not;
> he passeth on also, but I perceive him not."—Job, ix. 11.
>
> "Voir venir les choses, est le meilleur moyen de les expliquer."—Turpin.

INTRODUCTION.

1. Every one who has studied even to but a little extent the vegetation of plants, will easily observe, that sometimes certain external parts will transform themselves, and, in a greater or less degree, pass into the shape of those parts nearest to them.

2. So we see, for example, that the single flower transforms itself into a double one, when, instead of stamens and anthers, there appear petals, either quite the same in shape and colour with the other petals, or still bearing evident marks of their origin.

3. If we observe that, in this manner, it is possible for a plant to make a step backwards, and to invert the order of vegetation, then we shall become more attentive to the regular way which nature goes, and we shall learn those laws of transformation by which nature produces one part *through and out* of the other, and forms the most diversified shapes merely by the modification of a single organ.

4. The secret affinity existing among the different external parts of plants, as leaves, calyx, corolla, and stamens, which develope themselves *after and out* of each other, has, in general, been noticed by naturalists long ago; and has been the subject of special attention, and this phenomenon, by which one and the same organ presents itself to our eye under so many modifications, has been called the *Metamorphosis of Plants.* (Morphology.)

5. This metamorphosis presents itself in three different ways: *regular*, *irregular*, and *accidental.*

6. We may just as well call the regular metamorphosis a *progressive* one; for it may be traced from the first seminal leaves gradually upwards to the last development of the fruit; by transferring one form into another as on an intellectual ladder, progressing towards the highest point of nature. It is this metamorphosis which I have attentively studied for several years, and to explain which I undertake the present essay. We shall therefore, in the following order, consider the plant only so far as it is annual, and notice its progress from the seed onwards to its fructification, without interruption.

7. The irregular metamorphosis may be considered as *retrograde;* for as nature in the former case hurries on to its great destination, so here, in this case, it goes backwards one or more steps. There she produces flowers as by an irresistible propensity and with mighty efforts fits them out for fructification; here, on the contrary, nature seems enervated, and her powers feeble, and though perhaps agreeable to our eyes, still inwardly deprived of power and action. By the experience, with which this kind of metamorphosis furnishes us, we shall be enabled to discover what is secreted by the regular metamorphosis; we shall also see clearly here what we could suppose only before, and in this manner we are enabled sooner to attain our aim.

8. From that kind of metamorphosis, however, which as *accidental* originates in external causes, chiefly by insects, we shall turn our attention away, as it might induce us to leave the simple road we intend to follow, and to displace our aim. Perhaps we shall find occasion another time to speak of these monstrous excrescences, which are still kept in fixed limits.

9. I have ventured to give this present essay without reference to explanatory figures, which in many instances might be found necessary. I reserve to myself to add them in future, which may be done so much easier, as there is plenty of materials left to explain and complete this present small and merely preliminary essay. In that case I shall not be obliged to take such measured steps as now. I shall be able to add other analogous subjects and passages, taken from authors, partake of my views. Particularly, I shall

not forget to make use of all the works of those contemporary authors who are the pride and honour of this noble science; it is to them that I deliver and dedicate these pages.

[This essay was first published in the year 1790; it was reprinted in 1831, but Goethe did not fulfill the promises given in the above paragraph. It is greatly to be regretted that this truly great man—great as a poet, philosopher, naturalist, and historian, equally excelling in most of the different branches of science and literature—was prevented from bestowing more time and attention to morphology in his latter years. Finding himself unable to carry out his former intentions, and distracted by other literary and scientific pursuits, which completely occupied his time and thoughts, he added no original matter in the second edition, excepting a very interesting relation of his early life and botanical studies, in order to explain how he was led by degrees to conceive first the idea of a metamorphosis, and how he followed it out. And then he gives a compilation of passages from other authors, to show the influence and development of his original ideas by other scientific botanists. *Note of the Translator.*]

I. *Of the Cotyledons.*

10. As we are determined to observe the gradual development of vegetable growth, we have to direct our attention to the plant in that very moment that it bursts forth from the seed. In this period we may correctly and easily distinguish all its proper parts. It leaves its envelopes more or less behind in the ground; of these we shall take no further notice for the present. As soon as the radicle has taken hold in the ground, it pushes on and exposes to light the first organs of growth, which have been present already in the seed.

11. These first organs are known as Cotyledons, or seminal leaves.

12. They often appear deformed, as if filled with a raw matter, swelling out just as much in thickness as in breadth; their vessels are hardly distinguishable from the mass of the whole; they have little resemblance to a true leaf, and we might feel inclined to consider them as organs quite distinct from seed leaves.

13. In many plants, however, they approach nearer to the shape of leaves; they become more flat, and, exposed to light and air, assume the green colour to a greater degree; their vessels become more distinct, and begin to resemble the ribs of leaves.

14. Lastly, they appear to us as real leaves; their vessels are capable of the most delicate development; their resemblance with the succeeding leaves not allowing us to take them for proper organs, we call them, therefore, the *first leaves of the stem.*

15. It is impossible to imagine a leaf without a node, and a node without a bud (gem), so we may come to the conclusion, that the point where the cotyledons join must be the first true budding point of a plant. This opinion is justified by plants which send forth branches immediately out of the axillæ of the cotyledons, as *Vicia*, *Faba*, &c.

16. The cotyledons are mostly double and opposite, and this causes us to make an observation which will as we proceed, appear of still greater importance. These leaves of the first bud are *placed opposite*, even when the succeeding leaves of the stem will *be alternate.* Here, therefore, appears a contraction and connexion of parts, which afterwards are standing aloof and separated. Still more curious it is when the cotyledons appear as many small leaves, collected around an axis, from where the stem rise, bearing the succeeding leaves solitary and alternate around itself; which case may be closely examined in the Coniferæ. Here we see the cotyledons form a sort of calyx, and we shall in future have to remember the present case when we shall find other analogous phenomena.

17. Plants, which germinate with one seminal leaf only (Monocotyledones), we pass unnoticed for the present.

18. But we have to observe that even such cotyledons as approach nearest to the formation of leaves, if compared with them, will always be found of less perfect development. Particularly their margin is more simple, and presents few traces of incisions, as their surface is void of hair or other proper vessels of perfect leaves.

II. *Development of the Cauline Leaves from Node to Node.*

19. We may now closely watch the successive development of the leaves, as the gradually progressing actions of nature are now open before our eyes. Some few of the leaves have been present already in the seed-corn, folded up between the cotyledons, and in this state are called the plumule (gemmule, or primordial leaves). Their shape, if compared with the cotyledons and succeeding leaves, is different in different plants; but still, in general, they differ from the cotyledons in being flat, tender, and, in short, more like true leaves, of a green colour, with a bud at their base; so that their affinity with the other leaves is no more to be doubted: generally they are inferior to true leaves, by not having their margin so completely developed.

20. Meanwhile the ulterior development goes on from node to node throughout the whole leaf, elongating the central rib and spreading out side ribs, more or less inclining towards the sides. The different relations of the ribs towards each other are the principal cause of those many varieties of shape in leaves. Now the leaves may appear crenate, deeply incised, or composed of several smaller leaves, in which case they seem to form a perfect little twig. The Date Palm furnishes us with a striking example of the progressive modification from the most simple form to the most complicated. After several succeeding leaves, integral and simple, the middle rib begins to push on and elongate, the fan-shaped simple leaf is torn, separated into many leaflets, and another highly complicated twig-like leaf is developed.

21. In the same degree, that the leaf becomes more developed, the leaf-stalk developes itself, either as an immediate part of the leaf, or as a distinct organ, which afterwards may be easily separated from the leaf.

22. That this proper leaf-stalk (petiole) has a great inclination to assume the shape of the leaf, we may see in different plants, as in the Orange for example; and its organisation will give occasion to some observations, which we shall pass by for the present.

23. At the same time we shall not yet take any notice of the stipules; we only remark here, that if they form part of the petiole, they will likewise in the most remarkable manner be transformed with the metamorphosis of the leaf-stalk.

24. As the leaves derive their principal food from the sap of the stem, more or less watery and undigested, so they derive their greater development and refinement from light and air. When we see the cotyledons produced in the seed-corn not at all or very incompletely organised and developed, and as if filled with raw and undigested sap, so we shall see the leaves of aquatic plants, which grow under the surface of water, not so perfectly organised as those exposed to the free air. Plants will even produce smoother and less organised leaves in confined, low, and moist situations, which, if removed to more exposed places, will become rough, hairy, and altogether of a finer organisation.

25. In the same manner, we find the anastomose of the vessels which produce the cellular tissue of a leaf, by springing from the ribs and trying to meet at their extremities, if not solely produced by the influence of rarefied gases, still greatly assisted by them. If leaves of plants growing under water assume the shape of filaments, or become ramified like antlers, we feel inclined to ascribe this formation to the absence of a perfect anastomose. The growth of the Ranunculus aquatilis illustrates this theory in an evident manner; those leaves which are produced under water consist of thread-like ribs only, but those produced above water have their ribs filled with the cellular tissue, combining them into one integral leaf, by the perfect action of the anastomose. We find even leaves where this action has been in operation only partly, that in consequence they are partly integral and partly filiform, thus clearly showing the transition.

26. Experience has taught us that leaves consume different gases, which enter into combination with their internal fluids, and there remains no doubt that this digested sap returns to the stem, and forms the chief food of the bud, in or near the axil of the leaf. Scientific men have analysed these gases, contained in leaves and stems, and have perfectly ascertained this fact.

27. We observe in some plants that one node comes out of another. With the

Gramineæ, where the haulm is closed at every node, it is quite evident. Not so in other plants, which are either quite hollow in the centre, or filled with pith, or, rather, with medullary tissue. As it has been doubted lately whether pith deserves the highest rank, in consequence of being supposed the principal seat and cause of growth and vitality, and as it is now asserted, and I think with good reasons, too, that the internal side of the second bark, called the liber, is in reality this seat of vitality, so we shall now sooner become convinced that a node, deriving its food from the lower one, will receive this fluid in a more purified and filtered state, at the same time deriving benefit from the lower leaves, and that it therefore will be enabled to develope itself to greater perfection in nourishing its leaves and buds with a more digested sap.

28. In this manner, as the raw and unprepared sap becomes digested and finer, the plant itself will gradually become more perfectly developed, till it arrives at the limits fixed by nature. We now see the leaves in their greatest perfection, and shall soon observe a new phenomenon, which implies that the period we observed till then is at an end, and a second one is approaching—the period of flowering.

III. *Transition to the Flowering period.*

29. This transition will arrive quicker or slower. In the last case we generally observe that the leaves begin to contract again, specially to lose all their different incisions of the margin, but expanding more or less towards their base, where they are connected with the stem; at the same time we observe the space from one node to another becoming longer, or the stem at least to become much thinner than before.

30. It has been observed, that abundant food hinders the flowering period, but, on the contrary, that a less plentiful, even scarce supply, will accelerate it. Hereby we see still clearer the action of the leaves, of which we treated in the preceding paragraphs. So long as there are raw fluids left to digest, so long the plant will continue to produce organs fit for digesting this food.

(To be Continued.)

MISCELLANEOUS.

New and Rare Plants in Flower. *Crowea stricta.* Though the foliage and flowers of this scarce species, when contrasted with *C. saligna* and *latifolia*, were less distinct in appearance than they really are, the perpendicular habit of growth would immediately confer upon it a dissimilarity equally as striking as the specific appellation is appropriate; but even in these appendages, a casual glance will detect some difference; for while the shoots grow quite erect, are much more rigid, and somewhat ruddier than its congeners, the leaves are considerably shorter, and the florescence of a richer, brighter, and more uniform rosy red, suffused with glowing purple. The chief distinction, however, as it will be inferred, resides in the tendency to grow upright and the less irregular habitude assumed in comparison with *C. saligna*, with which, as it flowers, if anything, with greater freedom, it will be found a meet companion in every collection of New Holland plants.

The subject of our present remarks was a thriving young specimen raised from seeds obtained from Australia by the Messrs. Henderson, who produced it at a meeting of the Horticultural Society held in Regent Street, on the 2nd ult.; and subsequently we were favoured with the inspection of it in fine condition of bloom, juxta-positioned with *C. saligna* in their nursery at Pineapple Place.

Brassia maculata major. Blooming with all the freedom of the old spotted Brassia, we noticed this new species in a fine state in the rich collection of Messrs. Loddiges, at Hackney; and, as the flowers are considerably larger, the addition made to the specific distinction is well merited in the present instance. The ample lip of the species under notice is conspicuously distinguished by prominent dark-green spots on a ground-work of yellow green, and several of the long, narrow, sub-linear, greenish-yellow sepals and petals, measured upwards of five inches in length.

Epidendrum floribundum, var. A very vigorous growing plant, but apparently no more than a variety of the above, also came under our notice at the Hackney Nursery, exhibiting a numerously-branched terminal panicle nearly a foot in length, supported by a stout succulent-looking stem about 18 inches high; and in addition to the habitude being more robust in all respects than that of the original many-flowered Epidendrum, the inflorescence is also somewhat different, a green tinge supplying the place of white apparent in the lip and petals of the latter.

Hoya imperialis (Large-leaved variety). Mr. Glendinning has this noble Bornean climber in a very fine state at the Chiswick Nursery, just now; and those who are still sceptical as to the luxuriant condition it will attain to under successful culture, should embrace this opportunity of inspecting it, in order that the trite old maxim of "Seeing, being believing," may lose none of its recognised importance in the present instance; for, most undoubtedly this plant has realised the most eulogistic, though by some deemed exaggerated accounts that have ever been given to the public respecting the immense size of its flower-clusters, the freedom with which they are produced, or in fine as regards the size and substance of the flowers individually.

The specimen we are directing attention to, is a trelliaged one, nearly 4 feet high, and 2 feet diameter, flourishing and blooming with the utmost vigour, so much so, that we were enabled to enumerate upwards of a dozen flower-trusses in different stages of development, and these on both old and growing wood, four of which were fully expanded, and several others nearly so: one of these trusses of inflorescence measured 9 or 10 inches through, supported by a proportionately stout peduncle 8 or 9 inches long, and composing a magnificent umbel of flowers thirteen or fourteen in number, radiating on pedicels full 3 inches in length, the flowers themselves, when expanded, being equal in diameter to the length of their secondary footstalks.

It appears to delight in an extensive, well-drained, rooting medium, a slight bottom warmth, and brisk stove temperature, preserved in a humid state in warm weather; and whether we admire this truly *imperial* Hoya for the noble aspect of its thick, twining stems and luxuriant glossy foliage, or for the superb clusters of chocolate-coloured, shining, waxy flowers, which it produces so copiously, their prominent central columns of fructification, exhibiting the polish, and in their outward appearance the consistency of manufactured articles, yielded by the Ivory Palm, all must acknowledge it to be one of the finest climbing plants yet introduced to British collections.

Victoria regia. Several plants of this wonderful aquatic have been distributed from Kew during the current season, one or two of which we have recently met with in the principal metropolitan nurseries, &c.; but if we may infer from the progress this plant is making at the Royal Botanic Garden, and at Chatsworth, where the largest leaf is upwards of 4 feet in diameter, we should say that Messrs. Lowe of Clapton, and doubtless others who may have been erecting small tanks for its reception, will, ere long, require to set about their enlargement. In a zinc tank at the Clapton Nursery, the young plants are thriving well; and on visiting Kew a few days ago, we perceived that the large aquarium devoted to several luxuriant specimens, is also becoming too circumscribed for the much further development of the immense foliage of this "Queen of all the Lilies," the most expansive leaf in the "Victoria-house" there, measuring rather more than 2 feet across.

Lœlia Perrinii. A superb specimen in a pot containing fibrous peat and plenty of drainage, of this lovely Brazilian epiphyte, we observed in the orchidaceous collection at Kew, displaying a dozen spikes of its distinctly coloured, rich crimson-lipped flowers. In the same collection also came under our notice, those sweetly-scented but unassuming little orchids,—

Promenœa lentiginosa and *P. Stapelioides,* both natives of Brazil, and belonging to the tribe *Vandeœ,* the former composed quite an epiphytal mass of greyish-green leaves, and greenish-purple flowers, the labellums of which were dotted in profusion with crimson maroon. The latter species exhibited a like profusion of inflorescence, resembling *Stapelia* flowers, but differing from *Promenœa lentiginosa,* in being greenish-yellow in colour, and in the sepals and petals being spotted as well as the lip, though the latter appendage was itself distinguished by a greater density of similar-coloured dots.

In cultivation, the first-mentioned epiphyte appeared to prefer growing in a basket of Sphagnum moss, the latter to grow upon a block of cork-tree wood.

Phlox Drummondi alba. The many garden hybrids of this ornamentally-useful tribe for the flower-garden-vase, or greenhouse stage, are plentifully enough distributed in almost every shade of colour produced by modifications of red and purple-crimson, but the *white* hybrid, though such a pleasant contrast would arise from its employment in conjunction with the more brilliant coloured varieties, is rarely seen in a good state of cultivation, which is perhaps attributed to its more delicate habit when treated as a biennial, and multiplied, as most of the darker sorts are, by cuttings instead of seeds. Treated as an annual, it becomes more robust, but grown from cuttings, it is generally found too frail a plant for the open air.

Though not in a very vigorous state, we noticed it a short time since blooming at Messrs. Lee's, at the Hammersmith Nursery.

Luculia gratissima. At Messrs. Fraser's Nursery, in the Lea-bridge Road, we saw plants not more than ten inches in height, each having a vigorous cyme of pink-coloured inflorescence formed upon their summit.

Achimenes Jayii. In the Brooklands Nursery, Blackheath Park, Mr. Ayres directed our attention to the above pretty hybrid, partaking of the general appearance of *A. rosea,* and the colour of one of the prettiest and best to cultivate of this lovely tribe, namely *A. venusta.*

It may be observed in most of the nurseries, but we apprehend the plant is predisposed to mildew, and if so, should be discarded from collections rather than risk the contamination with mildew of its congeners.

Oxalis Bowiei. Perhaps one of the most attractive and beautiful objects in the garden of the Horticultural Society just now, is a protected bed of this handsome greenhouse perennial. It produces a charming display and contrast, by the unrestricted profusion in which its elegant crimson flowers are borne in large trusses, conspicuously elevated by stout peduncles, above a leafy carpet of rich and glossy verdure. There is a complete mass of it growing in a dry, and warm south border, fronting one of the principal plant structures, and protected by a lean-to low brick pit, intended for minor Cacti. These appear to be the proper occupants of the border, with an inter-plantation of this Oxalis, which upspringing from its dormant condition on the decline of summer presents in early autumn, the unusually charming feature of a bed of glowing crimson, contrasted with leaves of a vernal greenness; this, too, at a season when the severe frost of a single night, probably, has destroyed almost every vestige of floral beauty in the open air. Nor is this beautiful appearance exhibited by *Oxalis Bowiei*, altogether so transient as may at first be supposed; nearly two months ago it was in the condition described, in the Society's Garden; it is still fresh and beautiful, and there is a probability of its continuing so for a month or six weeks to come, through the circumstance of its being merely protected from nocturnal frosts and dashing rains, in the cold structure before alluded to. For an in-door display, it is at this season of the year also an invaluable plant, and in several places we have found it extensively in use, as at Messrs. Henderson's in the Edgeware Road, &c., and in a greenhouse at Wrest Park, the seat of Earl de Grey, in Bedfordshire: at the latter place in a luxuriant state. At the Horticultural Gardens, in the fine collection of orchids, we noticed, among others, flowering there, the ever blooming *Phalænopsis grandiflora,* in a fine state, with numerous long branching racemes in different stages of florescence; the more advanced ones profusely adorned with their ample paper-white, yellow-marked blossoms, and a beautiful plant of *Miltonia candida* is likewise deserving of especial mention, from the number of rich brown and auriferous-mottled, white and violet-lipped flowers, that were expanded on it.

Gum Tragacanth. The Common Gum, called Tragacanth, brought to us from the Levant, was thought by Linnæus to be produced by the plant called *Astragalus Tragacantha,* a French species, called by the botanists of that country *A. massiliensis;* but De Candolle assures us, that no gum whatever is furnished by that plant. Another species, the *A. creticus,* has been named as the source of the drug, and it does appear that a small quantity is obtained from that species in Candia, but certainly not the bulk of the samples of Commerce. Labillardière relates, that his *A. gummifer* furnishes Tragacanth on Mount Lebanon; but the samples obtained from thence are said not to be the same as those of commerce, being white and more transparent, and dissolving less readily in water. Finally, Olivier assures us, that the principal part of the Tragacanth used in Europe, comes from *Astragalus verus,* a Persian species. The only certain conclusion that can be drawn from these statements is, that Tragacanth is a secretion from some sort of *Astragalus* belonging to that curious division of the genus, which consists of spiny bushes. The subject has been very recently investigated by James Brant, Esq., Her Majesty's Consul at Erzeroum, who has sent excellent dried specimens of the Tragacanth plants of Koordistan, to the Hon. W. F. Strangways. One of these is labelled "The shrub that yields the white or best variety of Gum Tragacanth," and is the *Astragalus gummifer,* a very pretty bush, unknown in the gardens of Europe, and very much to be desired as an ornamental plant. For it is covered with myriads of short spikes of yellow flowers, embedded in wool, and surrounded by bright green smooth leaves.

Mr. Brant's other Tragacanth is labelled, "Shrub from which the red or inferior species of Gum Tragacanth is produced" This is quite a different plant, with hoary spiny leaves, and little cone-like heads of flowers, whose feathery calyxes are as long as the corollas. It is evidently very near the *A. microcephalus* of Willdenow. Hence it appears that the best Tragacanth is really furnished by *A. gummifer,* as Labillardière affirmed; that no additional evidence as to the accuracy of Olivier's statement concerning *A. verus,* has been obtained; but the existence of a third Tragacanth plant has been clearly ascertained, which has been named *A. strobiliferus.* Lindley, in *Bot. Reg.,* v. 26, p. 38, *Miscell.*

On the Motion of Gum in Plants. In his investigation of the anatomy of *Cycadaceæ,* Professor Morren has arrived at a fact of great interest in Vegetable Physiology. It is well known that all these plants yield an abundance of gum, which flows from them freely in a liquid state when wounded; and that the flow of such matter takes place in special channels, namely, in long fistulæ, whose walls are built up of cellular tissue. It is usually supposed the Gum is a secretion from the leaves of plants, and that it consequently flows from above downwards: it has been even compared to the blood, and regarded as the most pure, and most essential part of their nutritive matter. Professor Morren has, however, proved by some well-conducted experiments, that in Cycadaceæ at least the gum moves from below upwards, and that it arises in the stem, where it mounts into the leaves. The author, therefore, suspected that gum is an ulterior elaboration, excited, or brought about, or at least assisted by some acid, probably supplied by the leaves themselves to the trunk; a suspicion eventually confirmed by chemical investigation.

M. de Coninck, Professor of Chemistry at Liège, analysed the leaves of *Cycas revoluta,* and ascertained that they contained 1° chlorohydric acid, probably combined with soda or potash; 2° Oxalic acid, probably free; and 3° oxalate of lime, forming the principal part of the solid exterior layer of the leaves—a very interesting fact, inasmuch as superficial indurations of plants have always hitherto been ascribed to the presence of silex. From these facts, M. Morren concludes, that in *Cycadaceæ,* gum is formed at the expense of the starch of the stem, and that such a change is effected by the action of the free oxalic acid secreted in the leaves. We are, therefore, to understand that Gum is a form of the nutritive matter of plants; that, instead of being the result of vegetable digestion, it is a principle created by Nature for their crude food; that one, at least, if not the principal of the functional purposes for which starch is universally dispersed through the tissue of plants, is in order that it may be everywhere ready for conversion into gum: and finally, that it is in the form of gum that starch passes through the sides of the tissue in which its granules were originally generated.—*Bot., Reg.*, v. 26, p. 14, *Miscell.*

The Mume Plum of Japan. The Mume of Japan, is a yellow-fruited plum (*Prunus Mume,*) called by Thunberg in his Flora of that country, a Japan Apricot, is very common, and thrives in the most northern parts, where it grows 15 or 20 feet high, and is very like an apricot-tree. It is, however, in its wild state, or when made into hedges, only a thick bush, very much branched, and 8 or 12 feet high. It is commonly cultivated for its beautiful flowers, as well as for its fruit. The *Mume* is much spoken of in the Chinese and Japanese legends of their saints, and in the history of great men and celebrated poets: it is even looked upon as something holy. Pilgrims are shown ancient trunks of this tree under which deified princes have rested, and celebrated priests, or inspired poets composed their psalms and sublime canticles. For this reason young plants struck from cuttings of such holy trees have a great value throughout the empire of Japan. The *fruit* ripens in June. When ripe it is insipid, and therefore it is salted in a green state like cucumbers, and then is eaten as a vegetable, with rice and fish. Europeans, however, do not admire the sharp and bitter taste. When salted, the plums are often mixed with the leaves of *Ocymum crispum*, which give them a red tint. The juice of the green fruit is used as a refreshing drink in fevers, and is also indispensable in preparing a beautiful light pink colour with Carthamus or Safflower. In good seasons, the tree is in full flower in February, when the altars of idols and dwelling-houses are everywhere decorated with its branches, which the Japanese regard as a symbol of the return of spring. The blossom of the wild plant is white, but there are cultivated varieties with various shades of colour between white and red; and some are even green or slightly yellow. Double varieties are in most request, and dwarfed trees of that description are planted everywhere near dwellings and round temples. The largest collections of these varieties, said to amount to several hundreds, is in the possession of the Prince of Tsikusen. —*Bot. Reg.*, v. 31, p. 45, *Miscell.*

Frankincense Tree of Sierra Leone. The "Bungo," or Frankincense Tree, is an evergreen, and one of the most graceful in an African forest; it grows in great abundance in the colony and in the neighbourhood, and is generally found in rather elevated situations; its foliage is a very dark green, the leaf smooth and pointed, and not large; the trunk, which is rather smooth at first, is then curiously marked with white patches, which make the tree very remarkable at a distance. The lower stem is almost invariably perfectly straight, and at the height of 20 or 25 feet usually branches off; the range of height of the trees may be from 40 to 60 feet; when aged the bark becomes rugged, very thick, and the white patches disappear; the flower is very simple, white and small. The tree is subject to the ravages of an insect which bores holes in every direction, half an inch in diameter; the operations of this insect occasion the production of the "Bungo" in very considerable quantities; sometimes, no doubt, the gum drops pure from the tree, but the chief supply is mixed up with woody particles resembling sawdust, and is forced from the holes by the insect, and gathered from the grass and ground by the natives. When fresh, the gum is of a high reddish colour, translucent, and very fragrant, soft and adhesive. The native Timmanee women use the gum, powdered and mixed with palm oil, as a kind of perfume, and it is commonly sold in the market of Freetown for this purpose. The gum, when burnt on a red hot plate of iron, gives forth a very grateful and highly aromatic odour; by some it is supposed to be the true "Thus." The wood makes excellent fuel; the perfume it diffuses whilst burning, is extremely agreeable to most persons. *M. S. Melville, Esq., Bot. Reg.*, v. 25. p. 30, *Miscell.*

The Pisonai Tree. This is one of the most magnificant trees, both in foliage and flower, perhaps that exists. It appears to have been introduced during the Inca dynasty, into the valleys of Cusco, where, in a climate, the mean temperature of which is 60° Fahr., it attains such a size as is never witnessed in the largest of our European forest trees. It was generally planted about villages, in that of Yucay, the country residence of the latter Incas: eight leagues from Cusco, there exist specimens of it 5 fathoms in circumference, and nearly 70 feet high; the foliage, of a deep green, is thick and spreading, and the leaf is in shape something like the Cinchonas; it flowers in December, and is then one mass of carnation colour. *J. B. Pentland, Esq.. Bot. Reg.* v. 25, p. 18, *Miscell.*

Horticultural Gardens of Bhaugulpore. The most interesting object in Bhaugulpore, was the Horticultural Gardens, whose origin and flourishing condition are due to the activity and enterprise of Major Napleton, commanding the Hill-rangers. The site is remarkably good, consisting of fifteen acres, that were, four years ago, an indigo-field, but now a really smiling garden. About fifty men are employed; and the number of seeds and vegetables annually distributed is very great. Of the trees, used for shade and for ornament, the most conspicuous are the Tamarind, (of which one superb specimen stands conspicuous near the seed-room), Tecoma, Jasminoides, Erythrinas, Adansonia, Bombax, Teak, Banyan, Peepul-Sisso, Casuarina, Terminalia, Melia, Bauhinia. Of introduced species for ornament or use, English and Chinese flat Peaches (pruned to the centre to let the sun in), Mangos of various sorts, Eugenia Jambos, various Anonas, Litchi, Loquat, and Longan, Oranges, Sapodilla; Apple, Pear, both succeeding tolerably; various Cabul and Persian varieties of fruit-trees; Figs, Grapes, Guavas, Apricots, and Jujubes. The Grapes look extremely well, but require great skill and care in the management. They form a long covered walk, with a row of Plantains on the west side, to diminish the effects of the hot winds, but even with this screen, it is inferior to the opposite trellis of grapes. Easterly winds, again, blight them and other plants, by favouring the abundant increase of insects, and causing the leaf to curl and fall of; and against this evil there is no remedy. With a clear sky the mischief is not great, under a clouded one the prevalence of such winds is fatal to the crop. The white ant, too, attacks the stems, and is best destroyed or checked by washing the roots with lime-water, yellow arsenic, or tobacco water. The ornamental shrubs are Oleander, Bougainvillea, Tabernamontana, Ruellia, two species; Lantanas, Passifloras, of sixteen species; and Verbenas, Ixoras, Dracænas, Durantas, Quisqualis, Pergularias, and Convolvuli, Hiptage, Plumbago, eleven kinds of Roses, Jatropha, various Euphorbias, Crotons and Poincettia, Abutilon, and other Hibisci, Cassia Fistula, Jasminum, Lagerstrœmia, Buddlea, Clerodendrons, and such like. Of what we should call hardy perennials, annuals and bulbs, I saw Maurandia, Lophospermum, and Thunbergias, fine Petunias, Sweet William, Mignonette, Pelargoniums, Pentas Carnea, several Aristolochias, Escholtzia, Lupines, Clarkia, Schizanthus, Balsams, Violets, Clematis, Cannæ, Strelitzea, and various Marantaceæ, numerous Amaryllideæ and Lilies, Erysima, Iberis, Stocks and Wallflowers; Clerodendron, Nyctanthes, and many species of Vitex. These form the bulk of the garden; many of them being the same as we have at home, others replacing our Fuchsias, Rhododendrons, Azaleas, Andromedas, and such like natives of equally damp or temperate climates, to which the scorching sun at one season, or the periodical rains of the other are inimical.

Numerous Cerealia and the varieties of Cotton, Sugar-cane, &c., all thrive extremely well; so do many of our English vegetables. The Cabbages are sadly hurt by the green caterpillars of a white Pontia; and so are Peas, Beans, &c. Strawberries are now but in flower, and Raspberries, Currants, and Gooseberries will not grow at all.

The seed-room, a well-lighted and boarded apartment, measuring forty-six feet by twenty-four, is a model of what the arrangement of such buildings should be in this climate. The seeds are all deposited in dry bottles, carefully labelled, and hung in rows round the apartment to the walls; and for cleanliness and excellence of kind they would bear comparison with the best seedsman's drawers in London. Of English garden-vegetables, and varieties of the Indian Cerealia, and Leguminous plants, Indian corn, Millet, Rice, &c., the collections for distribution were excellent; and I am promised samples of all these for Kew by my liberal friend Major Napleton, as well as other economic products of the district.

Altogether the Bhaugulpore Gardens are extremely good, and considering (which it is difficult to do) that they are not five years old, they reflect the greatest credit on the energy and perseverance of Major Napleton. The grounds are under the immediate superintendence of Mr. Ross, a gardener of some skill and knowledge, who was once attached to the Calcutta Botanic Gardens. In most respects the establishment is a model of what such institutions ought to be in India; not only of real practical value, in affording a good and cheap supply of the best culinary and other vegetables that the climate can produce, but as showing to what department such efforts are best directed. They diffuse a taste for the most healthy employments, and offer an elegant resource for the many unoccupied hours which the Englishman in India finds upon his hands. They are also schools of gardening; and a simple inspection of what has been done at Bhaugulpore is a long and valuable lesson to any person about to establish a private garden of his own.

I omitted to mention that the manufacture of economic produce is not neglected. Excellent coffee is grown; and arrow-root, equal to the best West Indian, is prepared at 1*s.* 6*d.* per bottle of twenty-four ounces,—about a fourth of the price of that article in Calcutta. Another very interesting garden, though of course on a less pretending scale is a private one belonging to Mr. Pontet, an enthusiastic horticulturist, who has established many valuable plants from the Rajmahal hills in his grounds. He has also a good collection of minerals from the same hills, and is remarkably well informed on many points of their Natural History. A Himalayan Blackberry (Raspberry it is called here) was succeeding very well with him, by inclosing every fruiting raceme in a tin box, within which they ripened. As, however, I hope to return and visit the Rajmahals, possibly with Major Napleton and Mr. Pontet for my companions, I shall be able, at a future time, to give you more information about them.—*Dr. Hooker in Jour. Botany.*

NEW AND BEAUTIFUL PLANTS FIGURED IN THE BOTANICAL PERIODICALS.

Brassavola Digbyana. *Mr. Digby's Brassavola.* The most remarkable of all the Brassavolas, and amongst the most singular of orchideous plants, a native of Honduras, whence it was introduced by Mrs. McDonnell, the lady of the late Governor. It flowered at the Royal Gardens at Kew in June last, and is deliciously fragrant. The *sepals* and *petals* are pale purplish-green, and the lip white or cream-coloured.—*Bot. Mag.*, 4474.

Cupania Cunninghami. *Mr. Cunningham's Cupania.* A lofty growing shrub or tree, with large pinnated leaves, and the young branches especially clothed with ferrugineous down, and usually known in our collections by the name of *Stadtmannia australis.* It produces its panicles of white flowers in spring, and is succeeded by large clusters of orange-coloured downy fruit, which split open while yet attached to the plant, and exhibit the bright-orange pulpy arillus containing the seed. It is a native of New Holland.—*Bot. Mag.*, 4470.

Escallonia macrantha. *Large red-flowered Escallonia.* Our first knowledge of this fine Escallonia was from Mr. Cuming, who collected specimens in Chiloe; but it was Messrs. Veitch who imported living plants to Exeter, from the same country, through their collector, Mr. William Lobb. Its flowers are bright-red, and it is hardy, and without doubt the handsomest of all Escallonias known to us. *Bot. Mag.*, 4473.

Gonolobus Martiana. *Dr. Von Martius's Gonolobus.* A species closely allied to *Gonolobus velutinus.* It is a native of San Sebastian, Brazil, and proves in the stove of the Botanic Garden at Kew to be a large climber, loaded with pretty clusters of white flowers. Planted out in a mixture of loam and peat, or grown in a pot, it will cover a great space, and may be increased by cuttings planted under a glass in heat.—*Bot. Mag.*, 4472.

Metrosideros florida. *Copious-flowering metrosideros.* Called also *Melaleuca florida* and *Leptospermum scandens.* A native of dense forests in New Zealand, introduced long ago to our greenhouses by Mr. Allan Cunningham. It produced its brilliant red flowers for the first time in this country in May last at the Royal Gardens, Kew. It grows freely in a greenhouse, and from its disposition to produce roots from the main branches may be readily increased by cuttings.—*Bot. Mag.*, 4471.

Nymphæa ampla. *Broad-leaved Water-Lily.* The tubers of this handsome species of Water-lily were sent to the Kew Botanic Garden by Dr. McFayden, from Jamaica. The leaves are large, deeply and irregularly toothed round the margins. The flowers rise above the water, are white, and larger than those of our own *N. alba.* It requires the heat of the stove; when the leaves decay in the autumn, the water should be gradually withdrawn, allowing only sufficient to keep the soil in a state of mud during winter; at the same time lowering the temperature of the house.—*Bot. Mag.*

CALENDAR OF OPERATIONS FOR NOVEMBER.

FRUIT AND VEGETABLE DEPARTMENT.

Glass.

Cherries and **Peach Trees** in pots or tubs intended for the earliest forcing, should be introduced into a very gentle warmth about the end of the month, but a free exposure to the open air whenever the weather will permit, must be attended to.

Grapes which ripened in autumn and are now hanging on the vines for winter use, should be kept free from mould; this may be accomplished by following the directions given in October.

Pineries. Attend to what was said last month, which, with little alteration, will apply to this.

Vines in pots or tubs now brought into a gentle heat, and started gradually into growth, will ripen their fruit about the end of March.

Open Air.

Asparagus Beds should have their ripened haulm cut off and cleared away, also lay on a top-dressing of manure. This is the time to begin forcing roots for table.

Cherry and **Plum Trees** should be pruned when all the leaves have fallen, as whatever is done now, will relieve the operator from too much work as spring approaches.

Peach and **Nectarine Trees** against walls, if the leaves are not all fallen, slightly brush them up with a small birch or heath wisk; then draw many of the nails from the young branches to allow of the wood being equally exposed to the influence of the atmosphere.

Gooseberry and **Currant Trees** may be pruned as soon as the leaves have fallen.

Sea Kale forcing also commences; and attend to all routine business.

Make use of every fine day to gather any remaining late pears or apples still hanging on the trees. Mulch newly planted trees with litter; collect soils for different purposes, and make every preparation for winter; as the ground becomes vacant, trench it in ridges.

FLOWER DEPARTMENT.

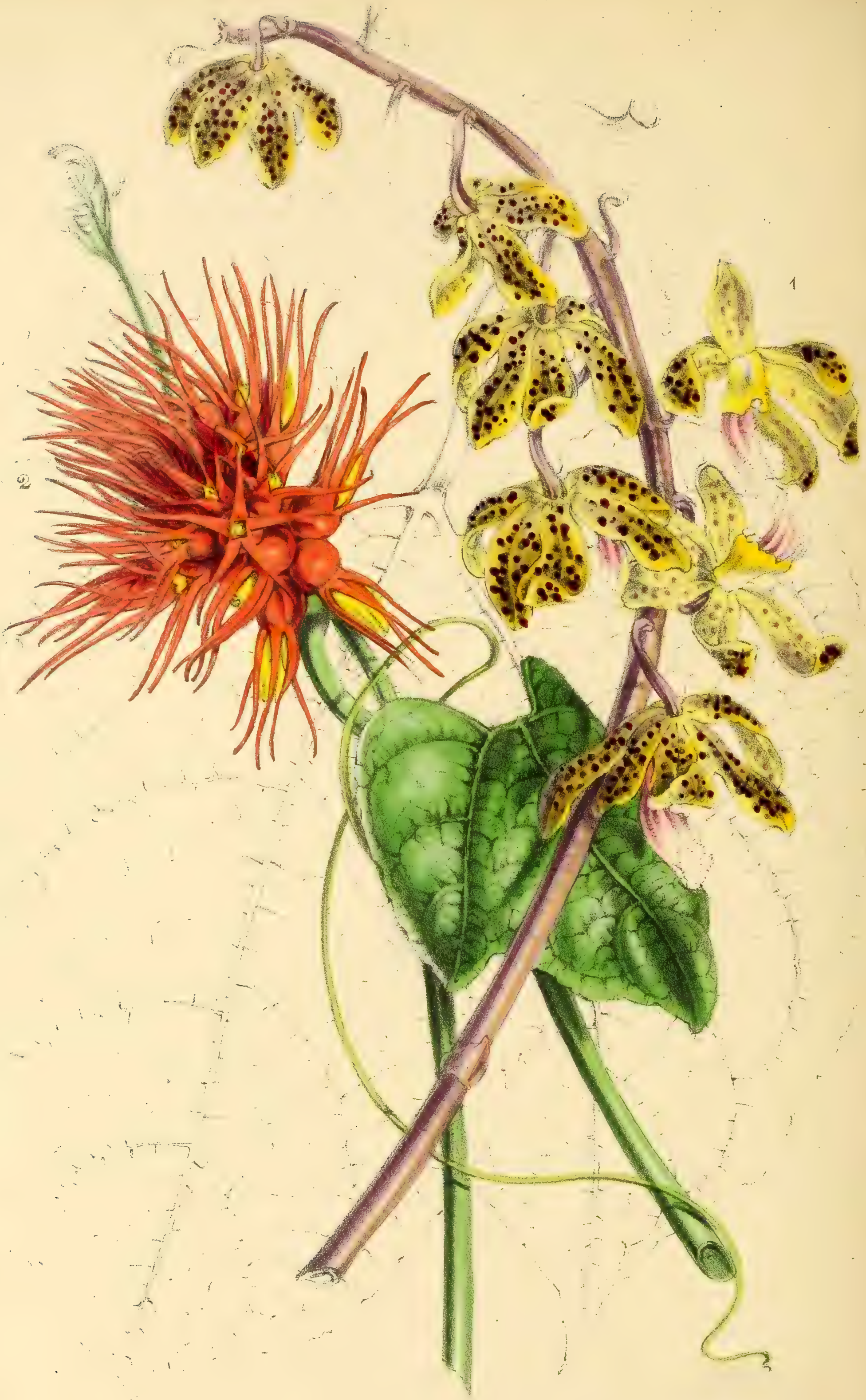
Glass.

Conservatory and **Greenhouse.** The directions and advice given last month are also applicable to this; as this month, however, is remarkable for fogs and damp weather with but little evaporation, it is advisable to be very sparing of water, only supplying it when the soil really indicates that it is quite needed; also, let a free circulation of air be supplied, and keep leaves dry; otherwise, many plants of tender foliage will suffer or die.

Orchid Houses must be supplied with air when it can be given without danger, and the plants both of this kind, and also those of the ordinary stove, may be treated as directed last month.

Open Air.

Progress with alterations, planting trees and shrubs, with as much speed as possible, as recommended last month. Clear away falling leaves, and be attentive to all routine business before winter sets in and prevents further proceedings.



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PAXTON'S

MAGAZINE OF GARDENING AND BOTANY.

WAILESIA PICTA. (Painted flowered Wailesia.)

Class, GYNANDRIA.——*Order*, MONANDRIA.——*Nat. Order*, ORCHIDACEÆ.——(Orchids, *Veg. Kingd.*)

GENERIC CHARACTER.—*Sepals* and *Petals* equal, spreading; lateral ones slightly oblique at the base. *Labellum* saddle-shaped, parallel with the column, and united to it at the base, forming by the junction a little sac; middle villous, base bidentate; sac without appendages. *Column* short, truncate, semicylindrical. *Anthers* two-celled. *Pollen masses* two, globose, excavated at the back. *Caudicles* two, narrow, and diverging, fastened to an ovate gland.

SPECIFIC CHARACTER.—*Plant* an epiphyte, with the habit of a Vanda or Angræcum, caulescent. *Leaves* long, in two opposite rows, coriaceous, channelled, three-ribbed, terminating in an acute nearly oblique point. *Peduncle* rising from the side of the stem, erect, nearly a foot long, deep purple, bearing from nine to twelve flowers, each about an inch and a half in diameter, externally they are brightly spotted with crimson on a pale yellow ground; inside the spots only just show through. *Sepals* and *Petals* spreading, narrowly oblong, blunt, very nearly alike in size, form, and texture, except that the two lateral sepals are slightly oblique at the base. *Labellum* oblong, saddle-shaped, blunt, and coarsely woolly at the upper end, shaggy along the middle; at the sides it is smooth, and streaked with crimson; at the base it is flattened and downy, united by the edges to the column, so as to form a small sac, but destitute of any appendage within the sac, except a small rounded callosity: above the sac, on either side, it has an obtuse linear smooth tooth. *Column* short, stiff, truncated, deep yellow at the end, rounded at back and plain in front, where it is moreover hollowed out near the base, and closely covered with a soft felt. *Stigma* a small transversed oval space near the summit of the column. *Anther* whitish, placed obliquely in rear of the stigma, with an ovate point and two-celled. *Pollen masses* two, globular, partially two-lobed, each attached to a long, narrow diverging caudicle, holding fast to a common ovate gland.—*Dr. Lindley's MSS.* and des. in *Jour. Hort. Soc.*, vol. iv., p. 261.

AUTHORITY.—Wailesia picta, *Lindl.* in *Jour. Hort. Soc.*, vol. iv., p, 261.

THIS new and very handsome Orchid is a native of Malacca, and has been long known to Dr. Lindley in a dried state, as being found in that island by Mr. Veitch's collector, Lobb, and bearing a near relation to the *epiphytes*, called *Trichoglottis*, by Dr. Blume, but this latter named genus is distinguished by having a distinct appendage within the sac of the labellum, and only a single caudicle for its two pollen masses: in addition to which the flowers appear always to grow in short lateral spikes, not in long erect racemes.

The plant from which our drawing was made was purchased at one of the spring sales in London, marked as "An unknown plant from Malacca;" it grows at Chatsworth, attached to a block of wood with a little sphagnum, and is suspended in the orchid house where it grows rapidly, and flowered in September and October last. Although not a very showy species, it is well deserving of a place in every choice collection.

We have not yet been able to increase it; but as it requires similar treatment to Vanda, and other plants of like habits, it may be increased exactly in the same way.

The generic name is given by Dr. Lindley, in honour of George Wailes, Esq., of Newcastle-on-Tyne, a gentleman who has for many years occupied himself with the cultivation and scientific study of Orchids.

GESNERA GARDNERI. (Mr. Gardner's Gesnera.)

Class, Didynamia.——*Order*, Angiospermia.——*Nat. Order*, Gesneraceæ.——(Gesner-worts, *Veg. Kingd.*)

Generic Character, page 194.

Specific Character.—*Stems* erect, herbaceous, rounded, quite glabrous, branched. *Leaves* opposite, very thick and fleshy, petiolate, elliptical, acute or slightly acuminate at both extremities, strongly serrated, obliquely nerved, very minutely pubescent when seen under a lens. *Petiole* half an inch or more long, terete, flattened above. *Peduncles* axillary, solitary, single-flowered, erect, slender, almost as long as the leaf, glabrous. *Calyx* five-partite; the *tube* short, united with the base only of the *ovary*, five-angled; segments subulato-lanceolate, spreading, entire, glabrous. *Corolla* tubular, a little curved, slightly widening upwards, subpubescent; *limb* of five short, obtuse, spreading lobes. *Stamens* four, didynamous, inserted at the base of the corolla, and equal in length with the tube, having a small, subulate scale, or fifth abortive stamen, between them. *Germen* ovate, hairy, as well as the long *style*, surrounded by a glandular disc, or ring, with five nearly equal obtuse erect teeth. *Stigma* obtuse.—*Hooker's Bot. Mag.*, 4121.

This plant is a native of the Organ Mountains of Brazil, where, according to Sir William Hooker, it was originally discovered growing in rocky places by Mr. Gardner, in 1841. Seeds of it were forwarded to Mr. Mackay, of the College Botanic Garden, Dublin, who had the honour of first flowering it in 1844. It has, however, since then been introduced by other parties, and has found its way into many collections.

Our drawing was made in September, 1846, in the stove of Sir George Warrenden, where it flowered profusely, and formed a very handsome object. Although not equal to some other species, yet, taken altogether, it is a very good kind.

The treatment is the same as for other like habited Gesneras; and it is readily increased by cuttings planted in sand, and placed in heat.

ADAMIA VERSICOLOR. (Various-coloured Adamia.)

Class, Decandria.——*Order*, Pentagynia.——*Nat. Order*, Saxifragaceæ.——(Saxifrages, *Veg. Kingd.*)

Generic Character.—*Tube of Calyx* adnate to the ovarium; limb with five to seven short teeth, having the recesses between the teeth broad and obtuse. *Petals* five to seven, alternating with the teeth of the calyx, surrounding the top of the ovarium. *Stamens* ten to twenty. *Styles* five, ending in rather clavate, somewhat two-lobed stigmas. *Berry* crowned by the limb of the calyx, somewhat five-celled, many-seeded. *Embryo* terete, straight, in a fleshy albumen, with the radicle turned towards the hilum.—*Don's Syst.*

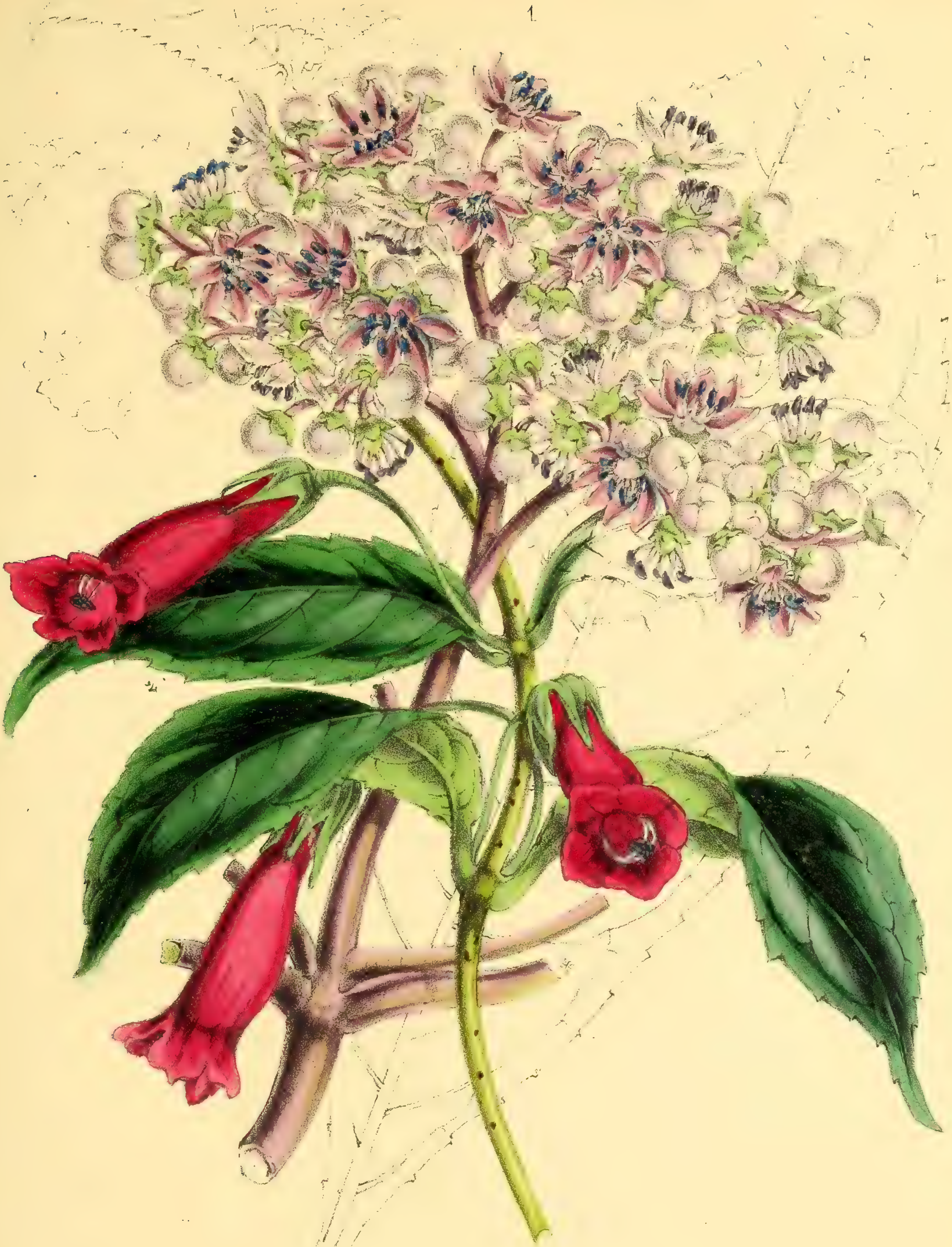
Specific Character.—*Plant* a dwarf shrub, with smooth *branches*. *Leaves* opposite, exstipulate, petiolate, oblong lanceolate, serrated. *Panicle* corymbose, terminal, many-flowered, in a pyramidal form, nearly a foot in diameter. *Flowers* when in the bud white, but gradually as they expand change to purple and violet, and then measure nearly an inch in diameter. *Petals* seven, occasionally six in number, forming a seven or six-pointed star. *Stamens* twenty.

Authorities and Synonymes.—Adamia, *Wall. Tent. fl. Nep. De Candolle's Prod.*; Adamia versicolor, Fortune's *MSS.*; *Lindl.* in *Hort. Soc. Jour.*, vol. i., p. 298.

This fine bush is described by Dr. Lindley, in the Journal of the Horticultural Society, as a native of China, whence it was introduced, in 1844, to the Horticultural Society, through Mr. Fortune, who found it on the island of Hong-Kong, growing in the ravines, about half way up the mountains. It has much the appearance of Hydrangea japonica, so far as the foliage is concerned. The flowers, however, are quite different. They form a pyramidal panicle, nearly a foot in diameter, and, when expanded, are of the most brilliant violet blue; when in bud they are at first white, but gradually change to purple and violet, until their full expansion, when they measure nearly an inch in diameter. The petals are seven, or, occasionally, six in number, and form a seven or six-pointed star.

In many respects the species agrees with Adamia cyanea, but its leaves and flowers are much larger, and it has twenty stamens, not ten.

It is easily grown in any good soil, and requires such treatment as is generally given to Hydrangeas, and similar plants; but it will be less hardy than they are, and will conse-



S. Holden, del & Lith.

1 *Adamia versicolor.*
2 *Gesnera Gardneri.*

quently require the protection of the greenhouse. It is readily increased by cuttings, treated in the usual manner.

The habit of the plant is good; and the fine large panicle of blue flowers, which it bears gives it a very ornamental appearance. Moreover, if it should fruit in this country, its fine blue berries will be as pretty as the flowers.

The plant from which our drawing was made bloomed in one of the stoves at Chatsworth, in October last, and although it was supplied with a higher temperature than stated above, which it appears to require, in point of beauty it fully bears out the character given of it by Dr. Lindley.

The generic name is given in honour of Dr. John Adam, of Calcutta.

ANGURIA MAKOYANA. (Mr. Makoy's Anguria.)

Class, MONŒCIA.——*Order*, DIANDRIA.——*Nat. Order*, CUCURBITACEÆ.

GENERIC CHARACTER.—*Flowers* monœcious, male flowers. *Calyx* five-toothed, campanulate. *Corolla* joined to the calyx, ventricose, red, with a five-parted spreading border. *Stamens* two, opposite. *Female flowers* with a calyx and corolla as in the males. *Stamens* two, sterile. *Style* semi-bifid. *Stigmas* bifid. *Fruit* two to four-celled, many-seeded, somewhat tetragonal. *Roots* thick, warted.—*Don's Syst.*

SPECIFIC CHARACTER.—*Plant* a perennial. *Stems* slender. *Leaves* three-lobed or somewhat five-lobed, veiny; lobes slightly toothed. *Tendrils* simple. *Male flowers* disposed in fascicles; pedicels very short. *Calyx* cylindrically campanulate, ventricose at the base, with a five-parted limb, of a rich vermilion colour. *Stamens* two, free. *Anthers* linear.

AUTHORITIES AND SYNONYMES.—Anguria, *Linn. De Cand. Prod.;* Momordica *of various Authors;* Psiguria, *Neck. Elem. Bot.;* Anguria Makoyana *of the Nurseries.*

THIS pretty perennial is not altogether a new plant, although it has not yet been recorded in our botanical catalogues; the honour of first introducing it to Europe, in 1846, is due to Mr. Jacob Makoy, of Liege, and from thence it was introduced to England by Messrs. Knight and Perry, in 1848, but of what country it is a native we unfortunately cannot ascertain.

It is a very free flowering species, and the fascicles of vermilion-coloured flowers are produced during several months, rendering the plant very ornamental, although the leaves are rather large for the size of the flowers.

Abundant drainage and ample root-room are important for successful cultivation, as otherwise the lower portion of the stem will become denuded of its foliage. A compost, like that supplied to the cucumber, will be in every respect suitable for this plant, provided a small portion of turfy peat be incorporated.

The temperature in which it grew and flowered in the nursery of Messrs. Knight and Perry, where our drawing was prepared in September last, is a cool stove; those gentlemen, however, think, that, like the cucumber, it will flourish in a warmer situation, with abundance of atmospheric moisture.

During the period of growth, great advantage is derived from syringing every sunny day; for, by this means, and occasionally smoking with tobacco, it will be kept free from insects, and its full development remain unchecked.

As far as Messrs. Knight and Perry are aware, the plant has not yet fruited in Europe; its real duration is, therefore, uncertain. Increase is easily effected by cuttings, a stock of which should always be kept on hand.

Anguria is the Grecian name for the cucumber; the specific appellation is given in honour of Mr. Jacob Makoy, of Liege, its introducer.

CHEMISTRY OF HORTICULTURE.—LIME.

By John Towers, Esq.

(Continued from Page 294.)

The Compounds of Lime, which now form our subject, are, in many instances of great importance to the cultivator. *Chalk*, that is, carbonate of lime, according to Professor Brande, is the most abundant compound of this earth; its elements, which are pure lime and carbonic acid, combine in the proportional equivalent of 56 of the former to 44 of the latter in the 100 parts. Carbonate of lime, as distinct from rock-chalk, exists naturally in a great variety of forms, some of them possessing much beauty. Among these are all the varieties of marble, crystallised calcareous spar, Iceland spar, transparent, with a doubly refractive power: the *Stalactites* of the caverns of Derbyshire furnish magnificent specimens. It is there we find it deposited from its solution in water acidulated by the carbonic acid, and substances immersed in this water become incrusted by carbonate of lime, when the excess flies off, as seen in the petrifying well at Matlock.

The process of petrifaction has neither been well understood, nor defined: the word, as derived from the Latin, implies a conversion of the substance so changed into stone. But objections have been urged against this, "because a very considerable number of the plants, shells, and the bones of vertebrated animals enclosed in rock are not at all petrified;" whereas the process of conversion into stone (*lapidification*) has been perfectly effected in objects of comparatively recent date, never imbedded in the earth, as the wood of a Roman aqueduct in Westphalia. There are also petrifying streams of water, into which small branches of trees that have fallen, and remained long immersed have, to all appearance lost the properties of wood, still however retaining the form of every vessel or cell in perfection. These facts do not bear strongly upon the processes of horticulture, otherwise than as they tend to impress upon the gardener the necessity of depriving any hard water which he may be constrained to use, of the excess of carbonic acid, by the addition of quick lime, in the manner and proportion described at page 261.

Sulphate of Lime—Gypsum, Plaster of Paris, is a mineral found in England, and when in masses is called Alabaster. The stone or rock-gypsum, being powdered, is, by a process called *dry-boiling*, reduced to the condition in which it is so extensively used as Plaster of Paris. It is found abundantly near Paris, where it forms the hill of Montmartre. The selenitic sulphates of lime occur in clays; particularly in the Oolitic, and are now produced among the diluvial clays, as at Scarborough cliff.

The crystallised sulphate of lime consists of

Dry or Anhydrous Sulphate, 1 part . . . . . = 68 or, per cent. 79
Of water in combination, 2 parts . . . . . . = 18 „ 21

Dry Gypsum is soluble in about 500 parts of water at 60°, and in 450 parts at the boiling point = 212°. As sulphate of lime is more soluble in water than pure lime, which latter has been seen to require at least 750 of water, no precipitation is caused, or sediment deposited when sulphuric acid is added to lime water.

As I before stated, some portion of Gypsum is very frequently detected in those waters which are called *hard;* generally however, it exists in smaller proportion than chalk, though often in company with it, as I have proved by a variety of tests.

Water that contains a little Gypsum, alone, cannot prove injurious to plants, particularly those of the *papilionaceous* order, for on such—as clover, peas, beans, vetches, sainfoin, and lucern—it was found most useful on the farm. Here, as in all theories upon which there exist doubts, nothing can be received which has not been proved by accurate analyses, repeated under every possible circumstance, of the living plant and its juices. If sulphate of lime be *bonâ fide* so detected, then we may safely conclude that the ground upon which the plant has grown contains more or less of that inorganic compound, which could not possibly be produced by the atmosphere, or absorbed by the leaves.

It is stated, and is a fact worthy of record, that the great Benjamin Franklin was the first to try the fertilising power of Gypsum upon Clover. "He sowed it on a field near one of the high roads of Pennsylvania, and formed the letters of a sentence like the following—'This is manured with Gypsum.' The effect was such that the letters could be readily distinguished by the height and colour of the Clover where the Gypsum had been sown. This naturally drew attention, and from that time it appears that gypsum has been regularly imported into America for manure from Havre."

In England its effects are most perceptible in light loams, gravels, and sands, where much vegetable earth is present.

Phosphate of Lime.—Bone-earth or bone phosphate. There are several combinations of lime with phosphoric acid; but the circumstance most interesting to the cultivator is the great natural fact, that the phosphoric acid evinces a strong tendency to form a *basic-salt* with lime. Bones contain a very large proportion of this basic-salt. Guano of good quality comprises from 10 to 25 per cent of it, and in a state of extreme fine division. It occurs abundantly in the Coprolithic deposits that have lately been discovered, and in the minerals known under the names of *Apatite*, *Asparagus-stone*, *Moraxite*, and *Phosphorite*. It is generally crystalline and massive; the variety found in Cornwall and Devonshire is beautiful, its primitive form a six-sided prism. Thus nature has, as it were, pointed out to man, by the abundant store of it which she provides, the very great value of the basal phosphate of lime. At a very high temperature it fuses into a white, opaque, or semi-transparent enamel; hence, in the manufacture of china, bones deprived, by distillation, of their animal fat and ammonia, are largely introduced in preparing the "china body" of the potteries.

Animal bones are found to consist pretty nearly of

Solid Cartilage, Gelatine, and Oil	51	per cent.
Phosphate of Lime	37·7	"
Phosphate of Magnesia	1·3	"
Carbonate of Lime	10	"
	100·	

The animal matter contains much nitrogen, hydrogen, and oxygen. In distillation, the two former unite to produce ammonia; the two latter to produce water—both, of course, combining in their proper equivalent proportionals. Thus, the liquor formerly called hartshorn, is produced from bones, and with it a quantity of empyreumatic animal oil. The basal phosphate, &c., left in the retorts, on being drawn from them while red hot, take fire owing to the combustion of some remaining animal matter, and finally become white.

When bone-dust came into use on the farm, a vast quantity of Turnips was produced; and, as a natural consequence, numbers of experiments were performed with a view to ascertain how, where, and to what extent this animal manure could with safety and efficiency be employed in Turnip culture. "The Book of the Farm" first appeared in the year 1844; its second edition is now in the course of publication, and, to a safer or more experienced instructor, I think it will be impossible to appeal, than to Mr. Henry Stephens of Edinburgh, its author.

"There is something," he observes, "in the action of bone-dust on the soil, and its consequent power to produce a Turnip crop, which I do not understand, the means being so inadequate to produce the results obtained. What I mean is, that up to a certain quantity this manure has evidently a beneficial effect; but, beyond that quantity, there is derived from its use no apparent benefit, in as far at least as the crop is concerned. I have tried to raise Turnips with quantities of bone-dust from 12, 16, 20, and 24 bushels to the imperial acre, and have found the crop improved up to 16 bushels; but any quantity beyond that, even 24 bushels, produced no greater effect on the Turnips in the *same field*, and on the *same sort of soil*, than 16 bushels!" This passage, be it observed, was printed in 1844, and five years have subsequently elapsed. In that short period chemical science has been brought into action, and has so far triumphed, that we are now enabled to pursue inquiries in a right direction; for we are now taught to seek for the operation of manure in the constituents of plants. Organic analysis was then scarcely thought of in reference to vegetable elements; now, however, it has been successfully appealed to, and thus the component elements of Turnip-tops, when reduced to ash, have been ascertained.

From one analysis of 100 parts, Professor Johnston has tabulated—

Potash	28·65
Soda	5·41
Lime	23·27
Magnesia	3·09
Oxide of Iron	0·86
Phosphoric Acid	9·29
Sulphuric Acid	12·52
Chlorine	16·05
Silica	0·86
	100·00

The ash left by burning the dry leaves of the Cabbage yield the following ingredients, according to the analysis of Dr. Fromberg:—

Potash	11·70
Soda	20·42
Lime	20·97
Magnesia	5·94
Oxide of Iron	0·60
Phosphoric Acid	12·37
Sulphuric Acid	21·48
Chlorine	5·77
Silica	0·75
	100·00

Thus, allowing for quantitative differences, we discover the food that plants require; and as it is certain that the native insoluble earths cannot enter into the structure, or form the nutritive juices of vegetables, the cultivator will gradually acquire certain principles by which to regulate his order of manuring. Phosphoric acid and lime are found in plants of the *Brassica* family, therefore bone phosphate becomes an appropriate manure. So far we may reason generally, and upon just principles; but the most refined experiments, and the utmost extent of discovery to which they have as yet led, tend only to the conviction, that we are only at the threshold of physiological science; and that, if we hope to *attain*, exertions must be unremitted, and analyses of plants and earth be instituted with scrupulous exactitude.

Bone phosphate was found to act unfavourably in heavy, binding soil; it then was early discovered that 8 bushels of bone-dust, combined with an indefinite quantity of coal ashes (which latter lighten a soil most effectually), raised as good a crop as 16 bushels of bone-dust alone. But of late it has been found better to reduce bones to the state of superphosphate of lime, by treating them with one-half their weight of concentrated sulphuric acid, diluted with twice its bulk of water—carefully adding, by degrees, the acid to the water, and not the water to the acid. This compound produces not only a biphosphate of lime, but also a considerable quantity of gypsum, in consequence of the union of sulphuric acid with the carbonate of lime in the bones. It is altogether found to act more effectively in raising Turnips upon clay soil than the pure bone-dust.

A great deal has been, and might be written on this subject; but hypotheses are dangerous unless they go hand in hand with practical experiments.

The other compounds of lime—as the muriate, nitrate, and sulphuret, do not claim particular notice. But I venture to suggest that a *chloride of lime* of full strength, mixed with about its weight of powdered alum, might be found not only to be a powerful disinfector, but also a very efficacious agent for the destruction of insects in the houses. Small quantities only should be tried, and the alum added gradatim, and not all at once. Chlorine is thus gradually, and for many hours, developed. If this hint be taken and acted on, we insist upon the greatest caution, and close observation. It may destroy the red spider at less risk than over-heated or ignited sulphur.

ON THE ROSE.

The localities mentioned by ancient authors, where the Rose was said to grow are but few in number, and among them are included, not only the places where it was indigenous, but also those where it was cultivated in the greatest profusion, or attained to its most perfect and luxuriant state.

Athenæus has quoted passages from the Georgics of Nicander, which inform us that Roses grew at Olenum, Megara, and Nisæa, cities of Achaia, in the Peloponnesus; also, that they grew near Phaselis, a city on the confines of Pamphylia and Lycia, provinces of Asia Minor. The finest Roses, however, he states, grew at Magnesia ad Mæandrum (Inekbazar-*Leake*), a city of Lycia, in Asia Minor. The Island of Tenedos he also observes produced Roses.

Lycia still retains its Roses; for we learn from the recent travels of Lieut. Spratt, and Professor E. Forbes, in that country, that, on the flanks of the Massicytus, a mountain of about 10,000 feet elevation, and forming one of the boundaries of the Xanthian plain, "*Roses* were observed in flower," (vol. i., p. 131). In Pamphylia also, Roses are still found. "Descending" (from Saharajik, near Phaselis,) "to the Pamphylian plain, we passed," say the above mentioned travellers, "through woods where the Cercis siliquastrum was covered with purple blossoms; and privets, and *Roses* were in flower." (Vol. i., p. 143).

"The north-west of Asia," remarks Mrs. Gore, in "The Rose Fancier's Manual," (pp. 6 and 9,) "which has been signalised as the fatherland of the Rose-tree, introduces to our admiration the *R. centifolia*, the most esteemed of all (roses), and celebrated by poets of every age and country. The *R. ferox* mingles its large red blossoms and thorny branches with those of the Hundred-leaved. Here also the *R. multiflora* attains a growth of fifteen or sixteen feet." The Island of Samos in the Ægean sea, celebrated for its salubrious climate, produced Roses abundantly. One of the Deipnosophists in Athenæus observes, that what is related by Æthlius Samius in his work upon the remarkable occurrences which take place in Samos, namely, that there, figs, grapes, apples, and *Roses*, are produced twice a year, appears neither improbable, nor untrue. According to Theophrastus, the *R. centifolia* was indigenous to the neighbourhood of Philippi, a city of Macedonia, and was also found in the vicinity of Mons Pangæus, in Thrace.

From Herodotus we learn, that in the gardens of Midas, Roses grew with a natural luxuriance, some of which had sixty flower leaves, and possessed a fragrance surpassing all the rest. It may here be remarked, that as early as the time of the Ptolomies, the art of gardening had advanced in the favourable climate of Egypt so far, that a succession of flowers was obtained all the year round. Martial, in one of his epigrams remarks, that Egyptian Roses were an esteemed present at Rome: that from Egypt Roses were brought formerly in great abundance to that city, but that in his time the Romans produced this flower in such quantities, that they would now be able to send them to Egypt.

The Roses mentioned by Pliny, for the most part, indicate by their names the localities from which they were either obtained, or where they were cultivated, or where they were the natural produce of the soil.

The Prænestine Rose obtained its distinctive appellation from Præneste, a city of Latium, not very far distant from Rome, to the neighbourhood of which, Horace sometimes resorted.

The Campanian Rose was a native of Campania, and flourished there most luxuriantly; clothing the soil with beauty, while as yet the corn had not sprung up. Here also grew the R. centifolia.

The Milesian Rose was so called from Miletus, a city of the Island of Crete, near which it is said to have been first found.

The Trachinian Rose appears to have been a native of Thessaly, and is supposed to have grown near the city of Heraclea, which was also called Trachinia.

The Alabandic Rose derived its name from Alabanda, a city of Caria, in Asia Minor. With the exception of the R. Græca, which, as we before observed, was probably a species of Lychnis; and also of the R. coroneola, which gained its specific name from the use to which it appears to have been specially dedicated, namely, to the forming of crowns and festoons; the remaining Roses mentioned by Pliny, derived their distinctive names from characters possessed either by the flower, or some other part of the plant.

The Island of Rhodes produced Roses; but it was not from this flower, as some have supposed, the Island was named, but from the Pomegranate, which grows there in great perfection, and it is the balaustium or balaustra, i. e., not fully expanded flower-bud of this latter plant, which appears upon the Rhodian coins.

The Pæstan Rose was cultivated at Pæstum, and is believed to have been indigenous to the soil of Lucania.

We now come to inquire into the periods of the flowering of the Rose; on this point, however, we possess very scanty information.

In Greece, the Rose appears to have blossomed in March; and the R. Græca, or Lychnis coronaria in May. In Italy early Roses were in bloom in April, and in May they were generally in flower.

Theophrastus relates that the Rose expanded its flowers in Egypt, two months before they appeared in Italy, and continued to produce flowers, for almost as long a period in the former country, after it had ceased blossoming in the latter.

In Greece the Rose succeeded the flowering of the Gladiolus and Hyacinth; it appeared somewhat late, and except when under cultivation, disappeared very soon.

In Italy, it followed the White and Purple Violet, the Narcissus and the Lily. The White Violet was the herald of spring, though in warm and sunny spots its flower might be detected in the winter season.

Having noticed the statements relating to the localities where the Rose was either cultivated, or flourished naturally, and also the periods of its flowering, we now come to consider the uses to which it was applied among the ancients.

First, we shall very briefly notice its medicinal uses, and under this division take the opportunity of referring to some of the preparations made from it.

The Rose and its preparations was believed to possess powerful refrigerating and astringent qualities, and in some instances, to act as a repellent, and emollient.

The root of one species of Rose, the *R. sylvestris*, or canina, was, as related by Pliny, believed to be efficacious in the cure of bites from mad dogs.

The preparations made from Roses were numerous; ointments, oils, wines, and waters, were made from them.

The most celebrated ointments were those made at Cyrene, a city of Libya, and that of Phaselis; the latter, however, was subsequently surpassed by that made at Neapolis, Capua, and Præneste. The Campanian Rose unguent was also much estimated, and made in such large quantities, that it was commonly said, that "more Rose unguent was made in Campania, than was oil elsewhere." Pliny states, that a wine was made from the expressed juice of the Rose petals; but gives no account of its mode of preparation. The parts of the flower from which the above-mentioned preparations were made, were the petals and their claws, or the smaller ends of the flower leaves. These were gathered with care, and submitted either to pressure for the purpose of obtaining the juice contained in them; or were exposed either in the sun, to be more quickly, or in a shady place to be more slowly dried, as was requisite. Sometimes the fresh petals were pounded up with other ingredients, and formed either conserves or unguents. The expressed juice was boiled down to the consistence of honey sometimes; at others wine was added to it previously to being boiled. The leaves of the flower also were combined with aromatics, and in this form were ignited, and emitted a fragrant odour, and used much after the same mode in which pastilles are at the present time. Rose oils were formed by soaking or boiling Rose petals with oil; and when wax was added to the oil so prepared, a cerate was formed.

The employment of Rose oil for anointing the dead is alluded to by Homer, when he represents Venus anointing the dead body of Patroclus with Rose oil; and it is not at all improbable that both Rose oils and ointments were extensively used on many festive occasions. The Rose, in various forms, entered into the prescriptions of ancient medical practitioners, and those of Celsus may be cited as examples.

Of the general and particular uses of these and other preparations of the Rose as medicinal agents, frequent mention is made by Theophrastus, Pliny, Oribasius, Actuarius, Marcellus, Myriscus, Celsus, and many others, but it is sufficient to indicate the sources from which information may be gained respecting the medicinal uses of the Rose; to proceed any further in this direction would be to collect information, which to the generality of readers would be devoid of interest or amusement.

In passing on to the more popular and general employment of this beautiful plant, it will be necessary to consider the use of flowers generally among the ancients, bearing in mind, however, that the Rose, the "queen of flowers," the consecrated "flower of love," whose colour is comparable only to that of the human complexion, and from whose chalice breathes "a divine fragrance," was of all flowers known to the ancients, the most beloved and esteemed; a flower, which Pliny says was known to almost all nations equally with wine, myrtle, and oil, and which was to be found almost everywhere. Notwithstanding this statement, and that the researches of modern travellers have shown the Rose to be indigenous to the soil of Greece, and of Asia Minor, there are writers who believe that the Greeks were wholly unacquainted with a Rose flower, which could justify the encomiums of the verses usually attributed to Anacreon, until after the year 332, B.C.

However favourable the soil of Greece was to the production of flowers and of fruits, we do not find that the cultivation of the former became an object of taste until somewhat about the time of Aristophanes, B.C. 434, in a passage of one of whose comedies we have the earliest intimation of the existence of flower-gardens; and it is probable that the flowers cultivated in them were those chiefly required for the weaving of crowns and forming festoons, such as Violets and Roses. At a later period we find descriptions of gardens, which are represented as producing in Spring, Violets, Lilies, Roses, and Hyacinths; in Summer, Poppies, and all kinds of fruits; in Autumn, Figs, Pomegranates, Vines, and Myrtles. We are not, however, to believe that these gardens at all approximated to the ideas we now have of a flower-garden; and the intermixture mentioned by Plutarch, of Roses and Violets, with Leeks and Onions, does not at all correspond with our present conceptions of horticultural beauty, notwithstanding we are assured by a writer in the Geoponics that the fragrance of the Rose is augmented and improved by being grown in the vicinity of garlic, or that

> The Pæstan Rose unfolds
> Her bud more loosely near the fetid Leek.
> PHILLIPS. CIDER. *Book* I. v. 254.

The employment of flowers was introduced among the Romans from Greece, and by them carried to an extent unknown to the nation which they imitated.

From the younger Pliny's description of his Tuscan villa, we learn that a level space in the grounds surrounding his residence was dedicated to the reception of flowers, and that there were flower beds scattered elsewhere among the shrubs.

The principal flowers cultivated by the Romans in gardens appear to have been Roses and Violets. Of the latter they possessed three kinds, the white, the purple, and the yellow; the last-mentioned appears to have been the greatest favourite in cultivation. They had also the Lily, the Crocus, the Narcissus, the Poppy, the Amaranth, the Iris, and the Gladiolus.

Flowers were, however, to be found in other places than in gardens attached to Roman villas. They were kept in the windows of houses; in small gardens formed on the roofs of houses; and very frequently in the centre of a space within the limits of the house, known as the peristyle, flowers and shrubs were either planted, or it was decorated with vases containing flowers.

The art of weaving wreaths, and plaiting garlands and festoons, was practised by a distinct class of people, both male and female, but chiefly by women and girls, whose care it was to combine all the most beautiful and favourite varieties of flowers and fruits with leaves of different kinds, so as to blend their forms and colours, and mingle their several fragrances together in the most attractive and agreeable manner. In Athens there was a market where these floral manufactures were carried on, and where they were also sold. To this spot resorted the opulent and luxurious of Athens, either for the purpose of purchasing garlands wherewith to win the partial smile of beauty, or to lounge away an unoccupied hour.

We shall next proceed to consider the employment of flowers as offerings or as ornaments to certain of the deities of Greece and Rome, and for adorning their temples, altars, and statues, and conclude by describing the occasions of either public or private festivity on which flowers were most frequently introduced.

CULTURE OF THE CAMELLIA.

By Mr. Errington, Oulton Park.

Who does not admire a well-grown and well-blossomed Camellia, with its glossy dark-green leaves, and bold-petalled, exuberant-looking flowers?

There are peculiarities about this charming plant which mark it out above most other flowers; and it seems to bid fair to be as enduring as to its popularity as the Geranium or the Rose.

For although our continental neighbours have poured their thousands and tens of thousands of Camellias into the British market; and although the Camellia has been planted against walls out of doors, in all quarters, made to form extensive undergrowths in woods and plantations, and even bedecked the cobbler's stall, yet nobody thinks a well-bloomed Camellia common-place in character, or beneath their notice.

For enlivening the dreary winter months, we know nothing equal to it, provided its culture for that period is done justice to. How to do that, according to my opinion, shall form the groundwork of my present observations.

In order to render my remarks familiar to the amateur, to whom principally I opine they will be useful, I must first premise that, for practical purposes, the culture of the Camellia, a twelvemonth round, divides itself into five periods; each of which, under a systematic course of culture, should, according to my notions, be recognised by all good cultivators as distinct in character; although, it may be, some of the features of management, at first sight, appear identical with those of another section.

The five periods, then, I would entitle as follows:—

1st period, forcing into wood.
2nd do. formation of flower-buds.
3rd do. maturation of flower-buds.
4th do. development of blossoms.
5th do. rest, necessary to the first period.

First Period.—Forcing into wood.

It was long before the true bearing of the policy as to its connection with successful winter flowering was understood or appreciated. Indeed, I am not assured that all our Camellia growers yet thoroughly recognise its importance. Be that as it may, with me it is the "keystone," and I think that I can show a winter-house of Camellias, from this period until March, against any competitor; not for extent, certainly, but for glossy, dark luxuriance, and the vast amount of well-fed blossom buds, which appear at first sight like a profuse crop of nuts; the leaves, too, being so very dark, as fairly to shame the most healthy Portugal Laurel. I name this merely to induce the reader to place some confidence in the mode of culture I am about to explain.

For the successful culture of the Camellia for winter flowering, it is absolutely essential that this forcing into wood take place very early in the spring. It is obvious, therefore, that Camellias blossoming in April or May, are not eligible; such, however, are needed in some establishments; but our business lies with the winter flowerers; nevertheless the same principles will apply to all seasons, a slight allowance being made for the intensity of light peculiar to the summer, of which more in our concluding remarks.

If I were required to select plants, for the future winter's flowering soon after Christmas, I should take those which had blossomed in the course of December; this is a narrow footing, but I give it in the way of illustration. Such, then, having ceased blossoming or nearly so, I should remove from the ordinary conservatory or sitting-room to a cool pit or frame, or to the shady and cool part of an ordinary greenhouse. And why? There is always a trifling amount of exhaustion, consequent on the free blooming of the Camellia; but being a willing plant, and it being Nature's ordination, as it would seem, that the wood-bud for the succeeding year should commence its development close on the heels of the flowering process, I endeavour to arrest this excitable character, in order to bring up all arrears of root action; for it must be understood, that although enough of reciprocal action has taken place between the leaf and the root, to enable the young bud to commence development, yet, in general, the additional energies imparted by a few weeks' partial dormancy are of immense benefit. This is a course I have practised for years, and I always find it forces more buds into growth than when hurried into that stage immediately on the heels of the flowering.

I am generally enabled to retard the growing principle by such means for nearly a month; but a very low temperature becomes necessary—35° to 40° is amply sufficient.

I have now been unwittingly drawn into a discussion of the fifth period, but will again revert to the first period, the forcing into wood.

What pruning is necessary should be performed the moment they have ceased flowering; or, indeed, somewhat before, if possible. The best situation to commence the growing process in, would perhaps be a pit, containing a small, yet enduring bottom heat, of about 75°; not, however, with the idea of plunging them, for I could never discover much lasting benefit to the Camellia by this course; what may be gained by a sudden impulse, is more than counteracted by the derangement of the drainage through the earth-worm; for few plants suffer more from a derangement of the drainage than the Camellia, especially if liquid manure be frequently used.

It has not, however, been my practice to use a pit for this purpose: I force the whole of my trees at once in the house appropriated to them, and in which they have both blossomed and rested. I merely cut off the hot water to effect the resting period, and turn it on in full power when the forcing commences.

A temperature ranging from 60° to 70° is, I consider, the most congenial to the forcing process: they will, however, do very well with a temperature of 55° to 60°, provided little air is given, and plenty of atmospheric moisture is maintained. To effect this I use the syringe freely at least twice a day: indeed, when the wood-buds are swelling, I keep the wood almost constantly moist.

Shading is particularly necessary during this period; the young buds of the Camellia are exceedingly delicate whilst unfolding their tender foliage. I employ a thin canvas, which admits a flickering light; it is probable, however, that our new rough plate glass will supersede in a short period the necessity for canvas.

Watering also is an essential item. The root should be well fed in order to force as many buds as possible to develope themselves. I use liquid manure very frequently during this stage. I will describe the kind I use, towards the conclusion of this paper.

Second Period.—Formation of flower-buds.

Now comes an important period indeed, in the earlier stages of which much nicety of management becomes requisite.

We all know that under ordinary circumstances the Camellia—especially if "pot-bound"—forms its buds readily enough; but how often do we hear complaints of such casting their buds: and why? simply because they are in a better condition to form buds than to maintain them afterwards. This often happens with the amateur, yet seldom with the nurseryman; and this because the former is not aware how much moisture is at times necessary to the Camellia; and if pot-bound, how often the interior of the ball, wedged up with hundreds of fibres, can scarcely be penetrated without steeping it occasionally, especially if through any neglect of watering the ball has become thoroughly dry. This, then, amongst other circumstances, shows that a systematic course is necessary, and that directions for the amateur should be very explicit; so much so indeed that old practitioners will be apt to consider them tedious.

It must not be thought that in thus noticing in a digressive way watering, this period in Camellia culture requires more water than any other; I name it here to pave the way to suggestions for a more liberal amount of pot-room, for such is quite compatible with free flowering, provided the cultivator exercises that control over his plants during the latter part of this stage, which a niggardly application of water will furnish.

In the earlier part of this stage a slight decline in the temperature may take place, 60° will amply suffice; more solar heat, however, will frequently compel the cultivation to stand at a higher pitch. Shading must be continued as before, and the only difference requisite is a free circulation of air, night as well as day, and a gradual diminishing of the amount of water, until the incipient blossom bud attains a decided character, which it will do in four or five weeks. It may here be understood that I intend a temporary check, yet not such a check as may interfere with the health of the plant, or the size of its foliage; such a check may be decried by minds unprepared for, and indisposed to a nicety in culture: I, however, advise no more than I have proved for many years.

A too severe check would materially impair the size of the foliage; I have, however, constantly found that the most luxuriant foliage may be obtained, and blossom buds as well, provided the root is in a sound and healthy condition: without this—as indeed with all other modes of culture—all niceties of atmospheric management must fall to the ground. As Mr. Barnes once observed in regard to the culture of the Pine, the main point is to cultivate them with plenty of live roots.

I would here advert, however, to the importance of supplying abundance of atmospheric moisture whilst the temporary check is going on; this it is which prevents loss of size in the foliage, and I may add, loss of colour also.

I may here observe that this check, through a very moderate allowance of water, is carried so far with a somewhat gross subject, as to permit the plant to flag a little occasionally. When the roots are healthy, I find no injurious consequences result from it: I may observe, however, that this is not permitted until the leaves have attained nearly, or quite their full size.

Liquid manure is, of course, entirely withheld during this stage or period; and after the checking system has been persisted in for a few weeks, most of the shoots will begin to show twin buds at their terminal points, or even three or four, as the case may be. Nothing more is necessary than to be very cautious in the return to a liberal watering, of which I shall speak in the next period. It may here be observed, that before a more liberal course of treatment is had recourse to, most of the young shoots should show the twin buds before alluded to, one of which is the true terminal wood bud, and the other an incipient blossom bud, of which more will subsequently be developed as the young wood becomes mature.

Third Period.—Maturation of flower-buds.

The horticultural tyro must not fancy that the periods here alluded to are as definitely detached as the divisions of my remarks. As may be inferred, they gradually merge into each other; this period, therefore, may be characterised as fairly commencing when the flower-buds are as large as peas; then it is my practice to commence a course of liquid manure. The characters of this will be hereafter described.

At the commencement of this stage a more liberal amount of watering may be commenced, observing to apportion its amount according to the character of growth;

those which are thoroughly set for blossom receiving a full watering, and those of a gross and undecided habit receiving it in a limited way. Indeed check, through partial drought, must entirely cease from this period, for if the plants commence their forcing process in February or March,—which they ought to do, if possible,—the period I now describe will be about the middle of May, by which time they will receive much natural heat, together with more light, and at times a greater amount of aridity in the atmosphere: water then must be liberally supplied.

This course pursued for a few weeks, still contriving to shade with thin canvas, and to syringe frequently, the buds will enlarge with great freedom; and with their enlargement the leaves will be perceived to increase, both in size and thickness, gradually exchanging their pallid green for a dark and glossy character; and if the root action is good, and the drainage perfect, the benefits of liquid manure will be speedily manifest. Towards the early part of July the buds will be three parts grown, and here I would advocate the turning the plants out of doors for a few weeks.

There is no absolute necessity for this course, as I have proved; kept in altogether, however, they are apt to become infested with the scale, and I have now found that turning them out for awhile is inimical to the spread of these pests, which will always be found to infest forced Camellias more than those which are treated in the ordinary way.

I have always deemed it necessary to use a canvas screen during bright sunshine, for two or three weeks after their first exposure out-doors. Towards the early part of August it may safely be withdrawn altogether, and now they will require more copious waterings still with the liquid manure; they must not be suffered to get dry at the root for an hour, if possible. This course pursued brings us to the

Fourth Period.—The development of the blossoms.

The commencement of this period may be marked by their re-introduction to the house, and my practice is, to get them in by the middle of September.

The house being duly cleaned and prepared, and the plants or trees housed, the course henceforward is very simple.

No shading will be requisite, provided the plants are in a sound and healthy condition; regular waterings of liquid manure must be followed up, and a thinning out of the buds must take place; indeed, the thinning out had better be performed before bringing them into the house, if possible. I do not like thinning them until the buds are half grown; they are then easily singled out, and if the practice previously laid down is carefully carried out, a considerable number may be parted with.

In the first place there is generally a cluster of buds around each leading shoot; sometimes a complete bunch at the terminal point. I generally reduce the point to a couple at most, and as my plants generally form buds in the cavity of the next two or three leaves downwards, I reserve on the average from four to five buds on each shoot; those shoots, however, of a weaker character, and lower down the stem, I leave, according to their strength.

At this very period, if there be any scaly insects on the plants, I commence a syringing process, which will soon destroy them, of which more under the head "Insects." Independently of this, however, provided there be no insects, the ordinary syringing is followed up, and a very liberal course of ventilation carried out.

It will be understood that I have been describing a course of practice pursued in order to have forced Camellias; that is to say, Camellias flowering all through the winter. Perhaps the term "forced Camellias" is not strictly applicable; it will, nevertheless, serve to convey an idea of what I mean. By the practice here described they will commence flowering in November, and continue blooming until the following March.

Now to ladies and gentlemen who spend their time in the country, as many do from the autumn until the "London season," the gratification of such a fine winter house of Camellias is very considerable; for of what benefit is it in such cases to have them blooming in April and May, which is the most usual period for those which are not forced.

To proceed. I do not apply any fire-heat until frosts occur, and then with great moderation indeed. The buds will continue swelling, and unfold when ripe in the most gradual way; and, indeed, on this gradual unfolding much of their size depends. As soon as they commence blossoming, all syringing must immediately cease; still, however, a reasonable amount of atmospheric moisture must be kept afloat, yet by no means allowed to condense on the leaves.

Now this is a point not easily accomplished when the dark and frosty days and nights of December arrive: if moisture exist in the atmosphere, and fires are used, the vapour will ascend, and in ascending come in contact with the glass roof, and this at the low temperature consequent on a sharp frost outside, will condense, and fall in drip on the plants.

What then is to be done? I will describe the practice by which I generally avoid the drip.

In the first place as to moisture. All watering is performed, of course, rather early in the morning, say by ten o'clock. I need scarcely observe that, under the circumstances, no attempt is made to raise atmospheric moisture; the most free and ample ventilation which the weather will permit is used night and day, and just as much fire applied as will sustain a temperature of about 50° max. by day, and 40° to 45° by night.

The maintenance of so moderate an amount of artificial heat, requires very little fuel, and admits of a liberal ventilation even at night. But this is not all, in extreme cases I have applied a covering of some kind to the roof, which course, indeed, combined with the precautions before-named, is, under the most trying circumstances, a guarantee against drip; which, I need scarcely observe, is fatal to the beauty of the Camellia, causing spots all over the blossoms, and indeed inducing premature decay.

It is well known that a portion of the atmosphere's moisture in the interior—albeit ample ventilation is provided—becomes, in extreme weather, frozen on the inside of the glass; that is to say, when no night covering is used. With a covering, however, and a free circulation of air, the vapour is dispersed as it arises, passing off, of course, at the back ventilators.

I have little more to say about the development of the blossom; I may merely observe, that to produce fine flowers, a temperature averaging 55° is requisite; but, nevertheless, it becomes necessary to fall back, in extreme cases, to the temperature before quoted; for it is not merely the development of the flowers, but their long continuance in blossom, which must engage the attention of the cultivator.

Having now discussed all the periods with which I set out, I may now beg permission to make a few concluding remarks on some general principles, which are applicable in a greater or less degree to the Camellia in all stages, and under most circumstances.

Soils and Potting.

It may not be generally known, that the almost continual use of liquid manure demands even a greater amount of or more perfect drainage than when clear water is used. Good drainage, indeed, under all circumstances, is one of the great essentials in the culture of the Camellia; and when the soil is rightly constituted, the water will pass through almost the moment it is poured upon it. When the water is observed to hang long on the surface of the pot, the plant should immediately be turned out and examined, and if it does not require shifting, the crocks or other drainage materials must be re-adjusted.

The common earth-worm is a great infestor of the Camellia, and the damage they cause in the drainage is enormous.

I never set my Camellias on the ordinary ground—always on a body of coal ashes; this will keep out the worms.

A little clear lime water may be used if worms are suspected, and the worms must be gathered up as they turn out of the soil.

The compost best suited to this plant, in my opinion, is about three-parts of a fibrous mellow loam, rather inclined to adhesiveness, and two-parts fibrous heath soil, which has become a sound turf through age.

These should have been procured twelve months or more, and should be well chopped with a sharp spade, but not riddled. My practice is to add a good sprinkling of finely crushed charcoal, and of coarse sand; the latter, however, depends on the amount of tenacity in the loam, and the character of the heath soil. After carefully placing the crocks over the bottom, so as to leave three or four bold apertures or outlets, I place a pounded mixture (from which all mere dust has been ejected) of broken crocks and charcoal; on this a thin layer of new sphagnum, and on this a little fibrous loam, from which nearly all the mere soil is beaten out. The ball being placed, lumps of fibrous loam and peaty material are wedged in all round at about equal distances; then a sprinkling of the finer compost well shaken in; then more lumps wedged round; and, finally, two or three inches of the general compost, the latter well pressed down—being used in a dryish state. I form the surface into a concave form, in order to coax the water for a while through the body of the ball of earth.

It may here be observed, that they should always be in a moist state when shifted; if any pot-bound plants, with hard balls, appear dry, the only course is to plunge them over head in water for half an hour; after they are taken out, however, they should remain in their pot for at least twenty-four hours before shifting, to drain away superfluous water.

Much difference of opinion exists as to the best time for shifting; one party shifting in the rest season, another after the plants have made their annual growth; the latter is my practice, but many good cultivators pursue the other course. Indeed, it is not very material, provided the subject has a sound ball and good roots, and that the subsequent management is good.

Liquid Manure.

This I consider a most important affair; not but that fine Camellias may be grown without it, but much finer with. By its use the flowers may be much increased in size, and the foliage rendered much more dark and glossy, than without it.

Many are the modes of making this liquid. I will, however, describe mine, which I use for all purposes, for the sake of simplicity, and, I may add, at nearly all periods, premising first, that I never use it unless clear, and always highly diluted.

All urinary matters are saved and exposed to the air for nearly a month at a time; they are then poured into a huge stone cistern, placed side by side with a vessel for soot-water. When a "brewing" takes place, the cistern is filled one-third with clear water—generally warm from hot water pipes contiguous. Into this, Peruvian guano at the rate of at least four ounces to a gallon is stirred, until the guano is dissolved. One-third more of the cistern is now filled with the urinary matters, and the remaining third is filled up with clarified soot-water from the adjoining vessel.

The soot-water is previously prepared by blending as much soot with water as it will carry: it requires well mixing, and after settling a day or so, is skimmed, generally a second time.

This, of course, constitutes a highly concentrated liquid manure, so powerful that no plant would bear its application undiluted. I, however, dilute it exceedingly, for I seldom use more than one pint to three gallons of clear water; our large water pots are about this measure, I believe.

I may here advert to the simplicity of its application. A large water-pot full of this liquid manure is always kept behind the Camellia house, outside of course. In watering, we draw water from a tap at the back of the house, inside; this tap receives its water from a hydraulic ram, and the water-pot of liquid manure being set beside the tap during the watering, the operator, after nearly filling his pot at the tap, pours about a pint of the powerful fluid into it. A couple of pots full will in general water the whole house, which contains nearly a hundred plants.

I have, I fear, been explicit to tediousness about the liquid manure; my object was, however, to prevent, if possible, any misconception, as liquid manures have, I fear, hitherto been prejudiced by thoughtless and unskilful applications.

As Dr. Lindley recently observed in his valuable paper, "weak, clear, and often," should be the maxim; indeed it is not quite clear to me, but we all use it too strong, even thus diluted.

Insects.

I must now draw my observations to a close, by a few remarks on the insects which most infest the Camellia; these are, as far as my experience goes, the scaly insect, and the ordinary aphides.

I before alluded to the application of soft-soap water for the extirpation of the scaly insect; my mode of application is as follows:—

Soft-soap is beat up in warm water after the rate of two ounces to a gallon of water; a vessel containing such mixture is kept at hand during the period of the formation of the bud; that is to say, from the time the flower-buds are first formed, until they are nearly as large as peas.

I before observed that regular syringings would be necessary; instead, then, of syringing twice a day with clear water, I use this mixture, and after a week or two of this treatment, the scale will have withered or disappeared.

For the ordinary aphides, of course, fumigation is had recourse to: the fly generally makes its appearance whilst the young shoots are extending, and the operation had better be gentle, and repeated two evenings in succession.

In conclusion, I beg to say, that I am perfectly aware that good Camellia culture is carried out by plans somewhat different from the practice here detailed. The same, however, may be said of the culture of most other tribes of plants, and although I do not by any means arrogate to myself the only good practice in this respect, I may add that the course here laid down will flower the Camellia during the dull winter months in high perfection.

ON THE RIPENING OF THE GROWTH OF PLANTS, AND ADAPTATIONS OF TREATMENT.

By Mr. Moore.

In the whole routine of gardening, few operations are more important than those conducive to the proper maturation, or "ripening," of the growth of plants; and in consequence of the variableness, and the frequent dampness of the climate of England, these, more than many other matters that call for the gardener's care, may be said to claim constant attention. This applies to all the departments of gardening—equally in the hothouse as in the open air.

The maturation of the growth of plants is a physiological question. This part of the subject it will be convenient, first to dispose of, by a brief summary of the facts which bear most directly upon it, leaving a more comprehensive and detailed elucidation to be sought in the many elementary dissertations on this branch of science. External to the plant, climate and food are the agencies to be dealt with.

Plants grow by drawing up from the soil through the agency of their roots certain alimentary matters, which the roots absorb in a liqueform or gaseous state. These matters so taken up by the plants form the sap—crude sap. If they are extracted from within a moderate distance of the surface in a soil of proper mechanical texture, that is to say, a pervious or porous soil, the plants obtain a due proportion both of the gaseous and watery elements proper for their nourishment, provided the soil itself is suitable in its nature; but if they are drawn from too great a distance from the surface, and especially if also from a soil, in which the proper mechanical texture does not exist, the watery elements will preponderate, the plants will take up watery sap, usually to be had in great abundance under such conditions, and hence will follow a much more luxuriant, and while the conditions last, a more continued, growth than would have taken place under opposite circumstances. The former of these conditions of the soil and roots is favourable to the ripening of the growth in due season; the latter is conducive to prolonged and excited growth, and antagonistic to maturation. Under ordinary circumstances the sap absorbed by the roots is carried upwards into the branches, spread out among the leaves, and then exposed to light, heat, and air. The effect of exposure to the influence of such powerful agencies is to drive off a portion of watery matter, and by a process called elaboration to change the crude sap into an organisable matter, called elaborate sap, out of which the flowers and fruits are formed.

But climate here fulfils a special office. In a dry climate, or in a dry season, the supply of liqueform food is cut short, and there is nothing to interrupt this elaboratory process, provided the opposite conditions have prevailed to a sufficient extent to have supplied matter for elaboration. On the other hand, in a damp climate, or during a damp season, when the soil and atmosphere are extraordinarily charged with humidity, the supply of liqueform food will be more or less augmented according to the circumstances; and if the conditions continue, the supply will be prolonged also, both of which interrupt, if they do not well nigh arrest, the elaboratory process, and tend to the production of leafy growth, to the exclusion of flowers and fruit.

When growing in a state of nature, plants of all kinds establish for themselves a certain balance between root and branch, variable indeed according to the conditions of growth, but clearly apparent whenever these conditions are favourable. Thus in nature as many branches are developed as the roots can nourish, and as many roots are formed as will suffice to furnish food to the branches. In artificial culture this equilibrium is, more or less, in all cases, destroyed, and hence in producing maturity or ripeness of growth under these artificial conditions, there is another agency to regulate and control.

Now since the growth of plants is dependent on certain conditions of food and climate, it would seem apparent enough that the agencies, by which the maturation of that growth is to be secured, are to be sought in modifications of the supply of food, and of the condition of the climate, by and in which the growth of the plants is to be carried on; and so in truth it is found to be. Large supplies of food and a dull moist climate are found to be conducive to vegetative growth; whilst a limitation of food and a bright arid climate are found conducive to the ripening process, provided always that the vegetative growth has advanced so far that there may be something to ripen. The chief agencies by which the cultivator may secure maturation of growth are therefore these—limitation of food, especially of watery food; exposure to drought; exposure to light.

Limitation of the supply of food is brought about either by the confinement or the abscission of the roots, the former being practised in the case of potted plants, the latter in the case of such as are planted in the open soil. The effect is the same in both cases, though brought about by an opposite process. In the one case the roots (whose spongioles are the feeding mouths) are allowed to multiply within a given space until the soil becomes exhausted, or many of the spongioles become fixed into positions where contact with the unexhausted particles of the soil is impossible. This is the condition of being what is called "pot-bound," the result of which is the ripening of the growth previously made, during the period when the roots were unable by contact with the body of soil in which they were placed, or in consequence of its yet unexhausted nutritious properties, to send up a bountiful supply of sap. In the other case the quantity of roots is reduced, periodically or otherwise, by cutting away portions of the larger and coarser ones, so that the number of feeding mouths is reduced. This is root-pruning in any or all of its phases, the effect of which is naturally the checking of all exuberant growth, by which means the proper maturation of the remainder is made a matter of certainty if the climatic conditions are favourable. Potted plants may at any time be still further restricted by root-pruning, if their constitutions are capable of bearing up against so rude a mode of treatment; and planted-out subjects may be permanently restricted by limiting the range of their roots. In limiting the supply of food by abscission, coarse tap-roots should, above all others and in all cases, be removed.

It is possible to feed a plant with food over-rich, and the effect of this is quite analogous to that produced by the absorption of too much watery matter, namely, exuberant leafy growth. The limitation of the supply of food for the purpose of maturation, must, consequently, comprehend the quality as well as the quantity of food; and food over-rich, as well as food over-much, must alike be avoided.

Exposure to drought is to a greater or less extent essential to the maturation of growth; and this is necessary both in respect to the soil and the atmosphere. The effect of a due, that is, moderate, degree of dryness in the soil, is to prevent the absorption of any great proportion of watery matter; and watery matters being those most readily absorbed, it is virtually a limitation of the quantity of food: this arrests growth in the sense of an extension or elongation of parts. Then if accompanied by a drying atmosphere, perspiration is accelerated, more watery matter is carried off, and organisable matter is more speedily prepared, and lodged in larger quantities in the parts destined to receive it. If soil drought is accompanied by the drying atmosphere, plants have then still less water to throw off, and, consequently, the process of elaboration and assimilation are so much the more readily carried on. Notwithstanding its advantages, however, exposure to drought at the root is rather a hazardous matter, with many races of pot-plants especially, for it is so very liable to pass beyond a safe limit, which limit the closest watchfulness will sometimes fail to observe. It ought, in fact, never to approach this limit too closely. With a dry atmosphere it is different. The effect of a drying atmosphere, as already observed, is to carry off the watery matter of the sap by a perspiratory process, and this is far less liable to reach an unsafe point, than is drying at the root. This too may, however, be carried too far, and then we have leaves dying at their tips and edges. This latter is exceedingly liable to occur in the case of plants not killed outright, nor stripped entirely of their foliage, if extreme drought at the root and in the atmosphere are coincident. The entire effect produced by a dry atmosphere, short of this destruction of the foliage, is conducive to elaboration of the sap, and to the maturation or ripening of the growth. Exposure to drought in the soil, so easily attainable in the case of potted plants kept under shelter, is simulated in the open ground by thorough draining. This operation, by removing all superfluous or stagnant moisture, admits air into the soil, and prevents the roots absorbing an excess of water along with their food; it does not, however, actually arrest absorption, which result is only brought about in very dry seasons by the desiccation of the soil owing to excessive and long-continued evaporation, which is an excess to be guarded against and counteracted as much as possible. Exposure to drought in the atmosphere is far less controllable, except in structures but sparingly ventilated; and hence it is in great measure that we see in dry warm seasons, not only the growth of out-door plants, but also that of all the hardier groups requiring shelter, becomes so much better ripened than it does in those which are cold and moist. The qualities of the all-pervading atmosphere cannot be changed, or to any material extent modified, on the large scale. Exposure to light—the degree variable—is an equally essential part of the maturative process; it promotes certain chemical changes necessary to the perfect elaboration of the sap, and what is called the assimilating process, without which elaboration and assimilation no perfect ripening or maturation takes place. Light is, however, the least controllable of the agents conducive to maturation. A bright or a dull season, for instance, makes all the difference in the ripening of fruit trees.

But what are the leading objects of the maturation of the growth of plants as it regards artificial cultivation? Undoubtedly the production of flowers and fruits. Wherever these objects are sought, maturation of the growth becomes all-important. The same process is, indeed, to some extent essential to the health and well-being of all the higher races of vegetables from their infancy onwards, but in a much slighter degree than is contemplated in this paper. For the production of blossoms, the precursors of fruit, *thorough ripening* is indispensable. Flowers and fruit are formed out of that organisable or elaborated or assimilated matter which becomes accumulated in the plant, on its exposure, to a certain extent, to those agencies that have been pointed out as promoters of the ripening process; and as this elaborated matter is only prepared under the influence of these agencies, they must have done their part before the production of flowers becomes possible. There are two antagonistic forces in plants: one tending towards mere vegetative growth, the increase of size in the individual, the development of stems and leaves; the other tending towards fructification, and developing from the same plastic material the organs essential thereto, namely, flowers. These two forces are called into play by different external conditions, the vegetative process being excited and maintained by abundance of food, and by liberal (not excessive) supplies of moisture, accompanied by a certain degree both of light and heat, of which a variable degree is required by different races; the fructifying process, on the other hand, being brought about by a limitation of food and of moisture, accompanied by a full exposure to light, and a certain varying degree of heat.

Are there, then, any races of cultivated plants in which the maturation of the growth in the sense contended for in this paper is not desirable? Decidedly. Maturation or ripening beyond that degree which Nature takes care to supply, in order to give due strength and solidification to the vegetable tissues, is undesirable in almost the whole race of cultivated vegetables; even those in which the parts of fructification are made use of, have, in the majority of instances, those parts so much altered in their nature, as not to form real exceptions to the rule. Herbaceous or succulent growth is here the object, and, therefore the ripening is inappropriate. In the culture of fruits, on the other hand, maturation is, as aforesaid, all-important; and it is equally so in the culture of ornamental flowering plants, though in the individual application of the agencies conducive thereto, almost unlimited variation is necessary.

FLORICULTURE.

By John Dickson, Acre Lane, Brixton.

The Cineraria.—This beautiful race of flowers has been more improved than any other I can call to mind, within a comparatively short space of time. The long pointed petal of flimsy texture and questionable colour, flat disk and straggling habit of this tribe, are no longer its general characteristics; on the contrary, they may be now recognised by their symmetrical proportions, round, broad, smooth petals—many kinds of velvet-like texture and consistency—varying in tints and intensity through all the shades of blue, crimson, purple, and white, tipped with every colour in the rainbow, with beautifully raised disks, splendidly proportioned, forming elegant specimens both in habit and luxuriance of foliage. The science of Floriculture may well be proud of its achievements, in contemplating the effects of its practice in connexion with the now magnificent Cineraria. Were other reasons wanting for its encouragement, they would surely be found in the early and luxuriant blooming of this Spring flower, and its comparatively easy cultivation. I have essayed several methods with it, some recommended to me by floricultural friends on the other side the Channel—some the result of experience of florists near home—adopting for my own practice those parts of the system of each which I conceived to be the most likely to facilitate the object I had in view—the improved culture of a flower I fancied well deserving the encomiums so liberally bestowed upon it, whenever a good specimen was submitted for public approval at any of the Floral Exhibitions. I have therefore no hesitation in giving the result of my experience in the matter, fully assured that no party will regret taking in hand a race of plants so rich and varied in their properties as the subject of these remarks; neither can any disappointment occur, as the least care in following the plain directions I shall have the pleasure of offering, will ensure perfect success, and with it unmeasured gratification to every one who delights in floral beauty; and it must be confessed it would be much more *difficult* to find those who *are not* than those who *are;* the present love for flowers being, in my opinion, the strongest proof of the increasing refinement of a class of persons who, some years since, were wont to spend their leisure hours in pursuits differing widely from so healthy a recreation. Nor does this prevalence of the love of flowers deteriorate their value in the eyes of those who do, and ever must (while good order prevails), lead the taste of others in such matters. The diamond placed on the hand of honest industry by its approver, does not lessen the value of the larger and perchance more brilliant gems that emblazon the crown of royalty. Nor does the rose, precious to many a poor cottager, bloom the less frequently within the precincts of the palace grounds, because a specimen of its tribe graces the plot—sacred to its reception (in many cases the sole possession)—of the humble artisan, who, so far as *pleasure* is concerned, sees the volatile deity only in the form of his bursting rose-buds, and knows enjoyment simply in the clustering blooms that overhang the home his labour upholds. That Floriculture boasts among its patrons the highest in our favoured land, there can be no doubt; that some of its most devoted admirers are to be found among the humblest is equally true: nor is this a subject of regret. The noble owner of a gem by Vandyke, Raffaelle, or Correggio, does not feel its value lessened by knowing that his dependent revels in the possession of a wood-cut of some subject rendered immortal by the pencil of those great masters. So with flowers: there are classes suitable to every cultivator and every admirer in the strictest sense of the word. For us, whose business it is to cater for all tastes, the immense diversity only affords additional opportunities of gratification, both individually and collectively; and lest the remarks my enthusiasm has lengthened beyond due bound, be deemed intrusive, I will, without further delay, hasten to the subject in hand, and suggest the best means for successfully growing the Cineraria that I know of, adding thereto a descriptive list of most of the best varieties out. Presuming that most of my readers are amateur growers of the Cineraria, and not adepts, I will commence with the young plants ordered from the nurseries, and sent out about the end of March or beginning of April. A greenhouse is the best receptacle for them, and if the collection is destined to be large, one appropriated exclusively to their use is most desirable, as it is requisite that the shelves should be as near the glass as possible, it being essential that the young plants should not be far removed from it. Plants so placed can remain for a short time, when preparations should be completed for re-potting them. The compost suitable for the operation should consist of thoroughly decomposed leaf-mould, one-eighth part might very well be constituted of an old melon or cucumber bed after re-potting them. Wait till you find they have taken root well in the compost with which you have supplied them. As soon as you ascertain this to be positively the case, re-pot them, taking out the crocks without otherwise disturbing them. As the plants increase in size, the compost may be enriched with advantage, which may be done by mixing rather more than half of the old soil with a similar quantity of leaf-mould for some varieties, and for others three parts of leaf-mould to one of soil. The plants are best potted, in a general way, about the middle of April, and again in a month afterwards, taking care that the pot is capable of holding the ball of earth and an inch or an inch and a half of additional soil, not wholly on the top, as it is not desirable that the upper roots should be covered too deeply. The beginning of June is a proper time to stick such specimens as are likely to require it. Care must be taken to do this in as neat a manner as possible. Expose them afterwards to a free current of air, shading them from too intense sun. During this and the following month the Cineraria requires some attention as regards watering, which is best done shortly after the sun has ceased to shine upon them; in very drying weather a little may be given early in the morning. Towards the autumn—say about August—small shoots may be observed to emanate from the roots, stem, &c.; they will quickly settle in the earth surrounding the plant, and if carefully taken up at the proper time, answer the purpose of increase without injuring the mother plant. These little shoots should of course be placed in pots of commensurate size, and in gentle heat, well shaded from the sun, and in two or three weeks the plants will have firmly rooted themselves. They will then require re-potting, when the front of the greenhouse is again their proper place, as near the glass as possible. In October, the large or specimen plants should be accommodated with a cool situation in the greenhouse (and they will do most seasons in a frame) where they must remain all the winter, receiving all the light, air, and sun the weather permits. Towards the latter end of January, or beginning of February, place them at a greater distance from the glass. The top of the house is now a good position for them to occupy, where they may enjoy the air whenever the weather admits of its being given with safety. In order to secure a continued supply, it is as well to retard the flowering of a few varieties; this may be accomplished by potting the plants again into larger pots by an inch, or an inch and a half, than would, under ordinary circumstances, be required previous to the flower-stalks rising. Good-sized specimens will continue in bloom six weeks, and a little care may lengthen that period to near two months (some seasons). Cinerarias fertilise with little trouble, and seed abundantly, more especially if kept in rather a dry situation, where they can have plenty of air and judicious watering. When the seed is ripe, it should be gathered, and kept dry for a short time, when it should be cleaned and sown immediately in finely sifted and rather sandy leaf-mould. They will appear in a fortnight or three weeks. When they have two well-formed leaves, and have two more just beginning to show themselves, you may judge it is a fitting time to prick them out into small pots. They should be placed on gentle bottom heat for eight or ten days, to induce them to strike out freely. As soon as they have made a little progress, they should be re-potted, and replaced for another week, when they may be exposed gradually to the open air, in order to strengthen them previous to the winter setting in; after which they should be subject to the treatment recommended for young plants. Fumigation must be attended to at proper times, never too powerfully. The grand points to be considered with the Cineraria, is never to allow them to want water while growing, but when at rest to withhold it as much as possible with the sustenance of life. Some people have recourse to the division of the roots to increase their stock. Such measures are certainly practicable, but I prefer the methods already given, as being equally good in most respects and better in some, as increase can be procured without injury to the large plants; and as the bushy style of growth is most admired, so I advocate the most possible means of securing the same. The following are a few of the many beautiful varieties in this class:—Henderson's Adela Villiers: form, good; colour, white, tipped with rich crimson; disk well-proportioned; size of the flower, large; profuse bloomer, and good habit. Henderson's Pauline, a most superb variety: form, excellent; petals, short, broad, and obtuse, of great consistency; colour, magnificent crimson, a pure self. This flower is one of those burnished varieties that assume different shades as the light falls on it. In one way we have the rich, pure, velvety appearance; and reverse it, and it is varied with a suffusion of crimson rays, that seem to burnish the petal, giving it a most gorgeous effect; the size of the flower, large; a profuse bloomer, and good habit. Henderson's Fairy Queen, a well-formed flower: pure white ground, delicately tipped with rose; disk, nicely raised and well-proportioned; compact-growing plant, an abundant bloomer, and good habit; size of the flower, large. Kendall's Richard Cobden: form, excellent; colour, a beautiful tint of blue, terminating in a tinge of rosy lavender at the base of the petals, assuming the form of concentrated rays around the disk, which is well-proportioned; size of the flower, large. Treng's One in the Ring: this variety claims attention rather on the score of its general appearance than on any individual excellence; form, good; colour, white, tipped with rosy purple; disk, well proportioned; size, rather small; free bloomer, and good habit. Treng's Gem: form, good; colour, splendid purple crimson; petals, round and broad; good habit; flowers well above the foliage. Kendall's Newington Beauty: form, good; flower, large; colour, purplish crimson, with white centre. Henderson's Beauty of St. John's Wood, a fine free-flowering and very striking variety: form, good; colour, white, tipped with crimson. Henderson's Alboni, a distinct variety, of dwarf habit: profuse bloomer; clear white ground, tipped with rosy lilac. Henderson's Maid of Artois, a fine shaped flower, with a brilliant centre; purplish blue; a dazzling, showy flower. Gaine's Vesta, a good variety; white, tipped with brilliant rose; disk, well-proportioned; a free bloomer, and luxuriant habit. Gaine's Brenhilda: form, good; petals, of more than usual consistency; colour, rich lilac shaded; as a variety, desirable in most collections. Holmes's Attractor: crimson self, fine form, but rather small. Jackson's Celestial: form, excellent; very dwarf habit; colour, brilliant blue. Henderson's Magnet: white ground, tipped with high rose. Henderson's Eleanor: fine formed flower; dark disk; ground. pure pearly white, tipped with rose. Henderson's Defiance: good colour, but not habit, owing to blooms not throwing up sufficiently above the foliage. Henderson's Carlotta Grisi, a very pretty and desirable variety. Henderson's Royal Crimson, Treng's Colossus, Purple Prince, Compacta, Formosa, Superb, Sir C.

Napier, Lilac Perfection, Emperor, Cerito, Annie, Zenobia, Nymph, Satellite, Pride of Surrey, Mauritiana, Modesta, and Alba Purpurea, are all good, some better than others of course, but in collections of any magnitude indispensable, as diversity in colour is one of the principal attractions with this class of flowers. This point made with taste and judgment, I will venture to say no cultivator of the Cineraria will regret the trifling outlay either of trouble or expense which offers such abundant and gratifying returns.

MOVEABLE SCREENS FOR WALL-FRUIT TREES.

By Mr. Fleming, of Trentham Gardens.

The production of the choicer of our hardy fruits has long been a *sine quâ non* in an English garden; but to attain to ordinary perfection in their cultivation, our precarious climate renders it necessary to take advantage of every invention or improvement which practice, aided by science, has introduced. A Spring like the last, when failure was the general rule, and a fair crop the exception, may be the means of introducing into general use many improvements in the management of wall-fruit, as it forces upon us the necessity of using better precautions for the future.

If we are wise enough to act upon this conviction, we may rely upon good crops in the worst of seasons, and even in ordinary years we shall not have lost our labour, as success in every case will be more certain and more complete. The fruits we particularly refer to are the Peach, the Nectarine, and the Apricot, the Grape and the Fig. In the cultivation of these, many gardeners have more than ordinary difficulties to contend with in the way of cold retentive soils and low damp situations, which are subject to late spring frosts, and all the concomitant evils of canker, blight, &c., and which are almost unknown in more favourable localities.

To this difference in situation we may ascribe much of the diversity of opinion which exists as to the necessity of covering our walls, and the proper materials to use for the purpose.

The subject has given rise to much discussion at different times, and especially during the spring past; but as no satisfactory conclusions have been arrived at, and as the matter still remains in a state of uncertainty, especially in the minds of young gardeners, who are liable to be perplexed by the variety of opinions set forth, I thought it might be of some service to mention the methods which I have found it requisite to introduce.

It has always been found necessary in our island, for the sake of protection, to train these fruit-trees flat against walls; but since the reduction of the duty on glass, Mr. Bellenden Ker has introduced a new method of growing these fruits, by training them on trellises on the open ground, and protecting them by means of a glass roof.

These protected trellises might, however, be rendered still more perfect by closing the front and ends with boards, to prevent the current of cold air, which would otherwise drive through the open space beneath the glass.

By fixing the boards on hinges, they would form ventilators, and thus, by affording the means of regulating the admission of air, the protected trellises would at once be constructed into peach-houses, fig-houses, or vineries, without any considerable addition to the cost.

It is our intention, however, to confine our remarks more particularly to the walls already existent in every gentleman's garden; that they may be rendered more productive than they are at present.

These erections of themselves afford considerable protection to the trees, and by absorbing heat from the sun's rays during the day, a stock is accumulated, and given off gradually by radiation during the night; something, however, is wanted to prevent the latter process being carried on too rapidly, or to too great an extent, and to retain the warmth in more immediate contact with the trees.

If some measures are not taken to effect this, especially in clear weather, the caloric continues to escape, till that state of things is produced, which we term "frost," or the absence of heat.

The ill effects of this are severely felt in early spring, while the leaf-buds and the blossoms are expanding; and especially after they have been excited into premature growth, by a few hours or days of particularly fine, though unseasonable weather.

The trees are thus exposed to a series of sudden starts and equally sudden checks, such as are at all times adverse to their health and well-being, but more especially so during the expanding and fecundating of the flowers, and the unfolding of their young and tender leaves.

Thus we arrive at the conclusion, that, during the winter and earliest spring months, it is advisable not only to protect the trees during very severe weather, but also to shade them from the effects of that which approaches the opposite extreme, and when the period arrives, after which we deem it proper to expose them to the genial warmth of the sun, that it is indispensable to protect them from cold and wet.

Perhaps no point that we have mentioned is of greater importance than keeping the trees dry during the winter and spring months, and especially after the flower-buds begin to expand; as they are enabled thereby to endure a considerable amount of cold without sustaining any injury.

These objects may be effected to a certain extent by the use of projecting or overhanging copings, which exert a very considerable protective influence over the walls, by preventing the upward radiation of the heat, and by throwing off the rain.

A very remarkable instance of their advantages came under my notice in a Scotch garden during the past autumn. At some time or other, a plain board had been fastened under the slightly projecting edge of the stone coping, along the entire length of the walls, but in later years it had been suffered to decay, and in two or three places it had fallen away altogether.

In these particular parts of the wall, the trees were altogether destitute of fruit, and had a sickly, woe-begone appearance; but where the boards were sufficiently in a state of preservation to answer the end for which they were designed, the trees were extremely healthy, and furnished with a fair crop of good fruit. I had here abundant evidence that these trees were under more favourable auspices than their neighbours; and the difference was most remarkable on the upper part of the wall, where the boards afforded the greatest amount of protection. These walls were sixteen feet high.

This instance, while it illustrates the advantage of projecting coping to a certain extent, shows further that of itself it is insufficient; and that some method of protecting the whole surface on the wall is necessary. Various cheap expedients have been recommended from time to time for this purpose, but most of them are objectionable, either on account of their inefficiency, or their untidy appearance; and all of them on account of the utter impracticability of removing or replacing them so frequently as the various changes of the weather render it desirable to do so.

The best of these, however, is a covering of evergreen branches; but if they be laid on sufficiently thick to answer the purpose in very severe weather, the shoots will be too much screened from daylight, and kept too close when it is mild.

The buds are consequently made tender, and incapable of bearing a moderate amount of cold after they are uncovered; as they unavoidably suffer if a night of extra severity occur after that time.

Experience has satisfied me that the best material for covering fruit-tree walls is common cheese cloth, or bunting; the only objection is the expense, but in the opposite scale I must place its perfect efficiency, the ease with which it may be removed or applied if properly arranged, its neat appearance, and its durability, if ordinary care is taken to preserve it, when not actually in use.

I have, during the last season, protected a small portion of the fruit walls by a combination of the projecting boarded coping, with a canvas screen, the latter being so constructed that the wall can be instantly covered or uncovered.

On this wall are some Figs and Grape Vines which were planted three years ago, and have carried a beautiful crop of fruit this season. The Grapes, which still hang upon the wall, are well swelled and beautifully coloured; and, from their very plump appearance, they promise fair to keep better than those in the hothouses.

With regard to flavour, a neighbouring nobleman who was passing through the gardens a few days since, on tasting these Grapes, pronounced them superior in flavour to those which are subjected to the more artificial treatment of the regular vinery.

It is proper to mention that the wall is flued; but the only heat it receives is by leading into it the flues of the Pine stoves, which are situated at a short distance. This is sufficient to keep the wall properly aired, but without any additional expense being incurred for fuel.

The results of my experiments have been so satisfactory, that I intend, with my employer's permission, to carry out the same plan of covering upon every wall on which we cultivate the choicer fruits above mentioned; as I am thoroughly convinced, that where other points are properly attended to, a crop may be ensured by these simple protective means; and as it makes all the difference between certainty and uncertainty, I think it will answer any one's purpose to incur the additional expense.

As there are many equally anxious with myself to combine utility and convenience, with genuine economy, I am induced to describe my mode of proceeding at the present season, that they may be able to apply it by the time when it will be most required.

The boards I use for the purpose are about twelve inches wide and one inch thick, and are screwed down to strong iron straps, which extend across the coping, and are held in their places by their ends being leaded into the stone. One edge of these boards lies on the coping, and has the same inclination, which is from front to back. By this arrangement, the water which falls on the boards, as well as that which falls on the coping, runs into a small groove or gutter at the lower edge of the latter; and from thence is conducted to the drains, by an occasional down spout. By this means we prevent the usual dribbling of the water upon the trees which cover the back of the wall, which is the more important, as this evil exists to the greatest extent when it is least endurable.

At the distance of two feet from the wall, a line of light neatly dressed poles are fixed in the ground, ten feet apart, and the upper ends are nailed to the edge of the boards. The object of the poles is to assist in supporting the canvas, and, by keeping it far enough from the walls, to prevent its injuring the trees when swayed about by the wind. The pieces of canvas are generally twenty feet long, and their width of course is regulated by the height of the wall. One edge of these, with narrow strips of cow leather as binding, is nailed on to the front edge of the boards, and the other edge is fastened in a similar manner to rollers of the same length as the pieces of canvas. The position of these is so arranged that the centre of each comes exactly half-way between two of the poles, and the ends are then evenly balanced.

The provision for drawing these blinds or screens up or down, is the next point of which a description is required. On the edge of the boards two pulleys are fixed sidewise, immediately over the centre of each roller. The end of a cord, of sufficient strength, is then fastened to the wooden coping at each end of each piece of canvas; these ropes are then passed down behind the canvas, returned up in front of it, and threaded through the pulleys which are fixed over the centre. At this point the two cords are connected, and one of them is left sufficiently long to be within reach of the ground.

In applying the method to the rest of our walls, it is my intention to deviate somewhat from the plan described above, by substituting iron uprights or standards instead of wooden poles. This will involve a little additional expense in the prime cost; but the difference in this respect between iron and wood, in general is more than counterbalanced by the superior durability of the metal; and, in addition to this, our framework will be much lighter and neater in appearance.

I have long been convinced that the great breadth which is generally devoted to the roots of wall-fruit trees, is not only useless but extravagant. Upon 12-feet walls I have therefore limited their roots to a border five feet wide and eighteen inches deep. Against the wall, the bottom of these borders is kept as high as the general level of the surrounding surface, and it inclines about a foot from back to front. The bottom is formed by concreting over a layer of rubble, but we find in practice that a stratum, equally impervious to the roots of fruit-trees, is made by common cinder-ashes, moistened with water and beaten solid. At the front of the 5-feet border is a gravel walk, two feet wide, which, besides facilitating our access to the fruit-trees, answers the purpose of a drain to the border.

In furnishing these walls with the canvas skreens, I intend to fix the feet of the standards at the outer edge of the border; as by this means its entire surface will be protected, and its value as a border on which to raise a few very early or choice things in early spring, is considerably increased.

I am aware that many gardeners will look very grave at this announcement, and set down our mode of procedure as retrogressive, rather than progressive, as we are going back to the old system of cropping fruit-tree borders. I must, however, beg leave to assure them that we are not going back, as we never could spare the surface which would be lost by leaving the fruit-borders entirely unoccupied; and experience has satisfied me, that the method I am about to describe, may be practised without injury to the fruit-trees, provided the plants are kept so far asunder, that the sun can still act upon the surface of the border.

Those who object to the growth of vegetables on fruit-borders, should qualify their objections by making a distinction between those fruits which require all the nourishment we can give them, and those which are more fruitful when they are limited as to space and depth of soil.

The former is the case with regard to the Vine, and, as a matter of course, we leave their borders uncropped; but in the case of our Peaches and Nectarines, even where their roots are confined to the very limited space above-mentioned, and where some light crop or other has been annually grown over them, we still find an occasional root-pruning necessary.

But it must not be supposed that we go the length of asserting that fruit tree borders may be promiscuously cropped with impunity; on the contrary, I know that they may not, and further, that the liberties we take with these must be limited, and regulated by care and judgment.

My plan is to plant about six inches from the wall, and four feet and a half asunder, a row of some very early kind of Strawberry; selecting for this purpose the first runners that can be obtained, a spadeful of good rich loam being pricked in with the point of a fork where the plants are to stand.

Exactly opposite these, and within a foot of the walk in front, a row of best curled Parsley, carefully selected from the spring-sown beds, is planted early in July; and in *quincunx* order, half way between the Parsley and the Strawberries, we shall plant a row of early Potatoes in December, immediately after the wall-trees are re-trained.

In this case also a spadeful of soil, such as we would use in frames for the same purpose, is laid down where each set is to be planted, and an additional quantity is given to each plant some time afterwards, when they require earthing up. One important point to be attended to is, that the spade never on any account be used in stirring or loosening the soil on fruit-tree borders; the fork is the proper instrument, and even with this, great care must be taken that the surface roots of the fruit trees be not injured.

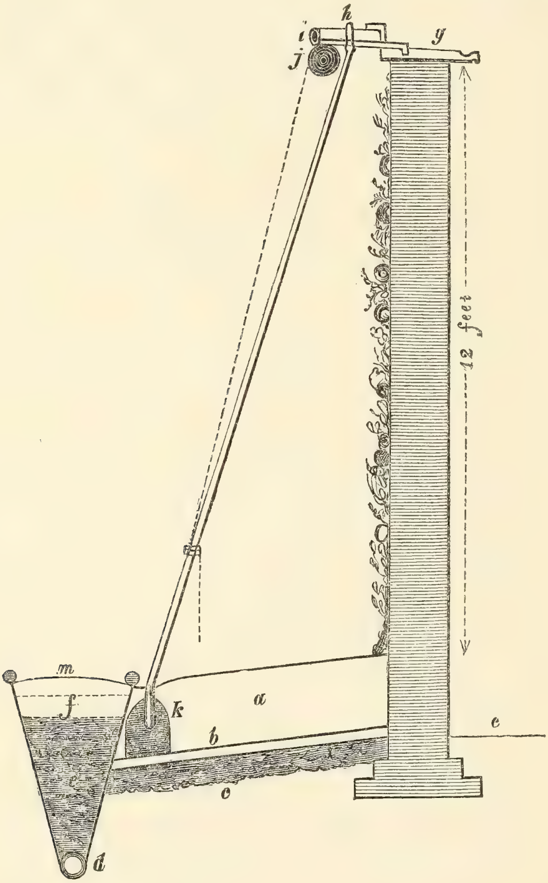
Besides the things here mentioned, a portion of the space may be devoted with equal propriety to many other useful things, which require a sort of cold frame protection during winter. Amongst these we may include various salads, but foremost of all we should name the lovely and sweet-scented varieties of that very popular flower, the Violet.

When the borders are injudiciously cropped, as much, if not more injury is done by the tops of the plants in shading the soil from the influences of the sun and air, as by the roots in exhausting it; but in the arrangement above described, as the plants stand so far asunder, we take advantage of the shelter and extra warmth of such a situation, without monopolising the entire surface. The distance to some may even appear too great, but it must be remembered that the individual plants attain to a much larger size when plenty of space is allotted to them; and as an instance of this, we may mention that we have Parsley plants now growing under a south wall considerably more than two feet in diameter.

As I recommend that the coverings be applied as soon as the leaves fall from the trees in Autumn, we derive an additional advantage from them, as the operation of re-training can be much more comfortably performed during cold or tempestuous weather, and a considerable loss of time is thereby avoided.

In conclusion, allow me to request my readers to picture to themselves the appearance of the fruit trees upon a clean washed wall, after they are neatly re-trained, and the monotonous appearance of the border relieved by orderly rows of plants; let these things be coupled with the elegant iron standards, with the screens tidily rolled up, the well-kept edgings and a neatly rolled walk, and then let me ask them if the *tout-ensemble* is not calculated to please and interest the minds both of the employer and the employed.

The accompanying section will assist in rendering the description of the plan intelligible.



Wall, 12 feet high 14 inches thick.

a, Fruit-tree border, 5 feet wide, 18 inches deep.
b, Bed of concrete or ashes, 3 inches deep.
c, Bed of rubble.
d, Drain, 3 feet 6 inches below top of border.
e, Rubble beneath front walk.
f, Gravel of walk.
g, Coping of wall, 3 inches thick at back, and channelled and thickening to 4 inches in front of wall.
h, Projected boarded coping, 1 front over wall.
i, Pulley for screen cord.
j, Roller for canvass screen.
k, Stone block in which the iron uprights are fixed.
l, Ground level.
m, Gravel walk, 2 feet wide.

GOETHE'S ESSAYS ON THE METAMORPHOSIS OF PLANTS.

(*Translated from the German by* EDWARD ORTGIES.)

(Continued from Page 315.)

30. If there is a surplus supply of food, this operation will necessarily be carried on, and a flowering period becomes almost impossible. In withdrawing food, therefore, we assist and accelerate nature; the organs become refined, the action of the digested sap is more powerful, the transformation of the organs becomes possible, and usually goes on without interruption.

IV. *Formation of the Calyx.*

31. Sometimes this transformation proceeds with great rapidity, and in this case the stem, from the base of the last perfect leaf, all at once shoots up, elongated and thinner, and collects at its extremity several leaves around its axis.

32. That the leaves of the calyx (sepals) are really quite the same organs which, until now, appeared to us stem leaves. They now, however, often assume a very different character, by being placed around a common centre; this may be proved in the most evident manner.

33. We have in the Cotyledons already observed a resembling action of nature, in seeing several leaves or even several buds collected around a common axis. Many species of Coniferæ produce in germinating, a radiating circle of unmistakable leaves, which, contrary to the general formation of Cotyledons, are already greatly developed; and we see in the very infancy of these plants the first slight traces of that power of nature, by which at a more mature age the inflorescence is produced.

34. Moreover, we find in several plants the stem leaves, without being greatly altered, brought together underneath the corolla, forming a sort of calyx. As they still bear their perfect shape, it will suffice to refer to our eyesight, and to the botanical term of "floral leaves" (bracts), which has been given to them.

35. With deeper attention we have to study the case already mentioned, where the transition to the flowering period proceeds slowly; the cauline leaves transforming and contracting by degrees, and as if gently insinuating themselves into the calyx; this we may readily observe in the calyx of the Sunflower, Calendula, and many others.

36. This power of nature, which collects several leaves around a common centre, shows us a still more intimate combination, and renders this collection of leaves still more indiscernible, by uniting them either partly or wholly. These leaves, lying so closely together, and touching each other in their infant state, become more or less united by anastomose through the influence of the greatly purified sap now contained in the plant, and thus form the campanulate, or so-called monosepalous calyx; but the incisions, more or less deep, show us still its compound origin. We may convince ourselves of this fact, by comparing a number of deeply-incised monosepalous calyxes with polysepalous ones; specially in watching the formation of the calyx in Synantheræ. So we shall see that the calyx of Calendula officinalis, which in botanical terms is described as simple and multipartite, consists, in fact, of several united leaves, adding contracted cauline leaves, which, as it were, stole themselves into the formation of the calyx, as we have mentioned before.

37. In many plants the number and shape in which the leaves of the calyx (sepals), whether separate or compound, are placed around their axis, is constant, as well as the number of the following parts. In other plants the number and shape of these parts is not so constant; but even this irregularity could not escape the keen eyes of observant botanists, and they have succeeded in bringing these deviations of nature into a narrower compass, by a more careful inquiry into their character.

38. In this manner, therefore, nature forms the calyx, by producing several leaves, and consequently several buds, around a common centre, mostly of a certain fixed number and order, which otherwise would have been produced in succession, and at some distance from each other. If the flowering period had been hindered by a superfluous supply of nourish-

ment, these leaves (sepals) would have remained separate, and have continued in their original shape. Therefore nature does not produce a new organ in the calyx, but merely combines and modifies those organs which we have known as leaves, and thereby approaches one step nearer to the great end of existence.

V. *Formation of the Corolla.*

39. We have seen that the calyx is developed by rarified sap, which by-and-by is produced in the plant, and that the calyx now in its turn becomes an organ for a still greater purification. This will become credible if we only consider its action as merely mechanical. For how very fine and fit for the most delicate filtration ought these vessels to become, which, as explained above, are contracted and drawn together almost to the highest degree possible.

40. The transition of the calyx into the corolla we may observe in more than one case, for though in general the colour of the calyx remains green, like the leaves, still it often changes colour in some parts, either at the points, margin, back, or inside, the outside still retaining the green colour; and we find this coloration always combined with a certain degree of refinement. In this manner an ambiguous calyx is often formed, which might with the same right be taken for a corolla.

41. After having observed that upwards from the Cotyledons a great expansion and development of the leaves takes place, chiefly at their circumference, and from thence to the calyx, a contraction of the leaves, we may now observe another expansion in the formation of the corolla. The leaves of the corolla (petals) are generally much larger than those of the calyx (sepals), and it may be shown that, as the organs in the calyx become contracted, they will expand in the corolla, refined to a great degree by the influence of purer sap, filtered by the calyx, as new and quite different organs. Their tender organisation, their colour and odour, would render their origin quite indiscernible, if we could not watch and surprise nature in several extraordinary cases.

42. So we find sometimes inside of the calyx of the Pink a second calyx, partly green, indicating the tendence to a monosepalous and partite calyx, partly lacerated, and at its points and margin bearing the rudiments of delicate and coloured petals, thus in this instance clearly showing the affinity of calyx and corolla.

43. The affinity of the corolla with the leaves shows itself in several ways; for the leaves of several plants become more or less coloured long before they approach to the state of inflorescence; others become completely coloured near the flowers.

44. Sometimes nature seems to omit the calyx only forming the corolla, and in this instance we have likewise the opportunity to observe the transmutation of leaves to petals. So we find sometimes a Tulip-leaf become a petal of perfect shape and colour. It is still more curious, if, as it sometimes happens, such a leaf appears half green, connected with and belonging to the stalk, at the same time that the other half is coloured and raised with the corolla (Perianthium), so that the leaf is torn in two parts.

45. It is a very probable opinion, according to which the colour and odour of the petals is accounted for by the presence of the male seed (pollen) in the flower. This seed, contained in the petals, is probably not yet elaborated enough, but combined and diluted with other saps; and the beautiful shades of colour lead us to think that the matter contained in the petals has attained a great degree of purity, but not the greatest, in which case they would appear white and colourless.

VI. *Formation of the Stamens.*

46. This will become still more probable, if we consider the great affinity of petals with stamens. If the affinity of all the other parts among each other was equally striking, so generally observed, and placed beyond all doubts, this present essay would then appear quite unnecessary.

47. In some cases nature shows us this transition quite regularly, as, for example, in the Canna, and several other plants of this family. A genuine and little changed petal contracts at its upper part, where it bears an anther, and forms in this instance a true filament.

48. We may best observe this transition in all its stages in flowers inclining to become double. In several kinds of Roses we find in the inner circle of the complete petals others which are contracted, either in the middle or on the sides. This contraction is caused by a small wart, which approaches more or less to a perfect anther, and in the same degree the petal will resume the more simple form of a filament. In some flowers of the double Poppy we find perfectly developed anthers resting on little changed petals of the very double corolla; in others the petals are more or less contracted by anther-like warts.

49. If all the stamens become transformed into petals, the flower will become sterile; but if there are some stamens left, the fecundation may take place.

50. And so we see that a stamen is formed when those organs which we saw expanding as petals, become again contracted, and at the same time much finer than before. The above-mentioned observation finds here again its confirmation, and this alternate action of contraction and expansion, by which nature proceeds to her aim, will more and more claim our attention.

(To be continued.)

MISCELLANEOUS.

The Chinese Cultivation of Tchou-ma, or Chinese Flax. Among the products of Chinese industry which were exhibited a few years ago at Paris, in the Rue St. Laurent, were some pieces of a fine silky tissue, called by the Chinese *hia-pou*, or summer-cloth, and made of the fibres of the plant called by botanists *Urtica nivea.* The cultivation of this plant in China is as follows:—The seeds are sown in the third and fourth month in a light sandy soil, situated near a river or a well. The ground is dug once or twice, and beds are formed 1 foot broad and 4 feet long, after which the ground is again loosened up, after which it is evenly beat with the back of the spade or foot, and raked to an even surface. The next night the soil is watered, and on the following morning is again loosened up and levelled as before. Then 4½ pints of moist earth and 1 pint of seeds are well mixed together, which quantity is sufficient to sow 6 or 7 beds; the seeds are not covered with earth, or they would not vegetate. Support a light roof to shelter the bed from the sun, and make this roof thicker in proportion to the increase of heat. Give no water until after the seeds have germinated and the young leaves have become strong, but keep the roof damp that the plants may not become too dry. At night remove the covering, to admit of the young plants catching the dew. When the plants are an inch or two high, remove the covering altogether; and if the soil is dry, supply as much moisture as will penetrate into about 3 inches depth of the soil. For *transplantation* a stiffer soil is chosen, and thrown into beds as before. Water the seed-beds the night previous to the young plants being removed, and before beginning to plant the next morning, water the new beds, and then dig up the young plants with a spade, carefully keeping a small ball of earth to each, and prick them out to the distance of 4 inches from plant to plant; and keep the ground betwixt them clean and often stirred up. At the end of three or five days the earth must be watered, and again at the end of ten, fifteen, and twenty days. After the tenth month the plants must be covered with a foot of fresh horse, ass, or cow-dung.

When the tufts of the tchou-ma are strong enough, the earth around is dug, and new stocks are detached and transplanted elsewhere. The principal stock then grows more vigorously. At the end of four or five years, the old stock becoming excessively strong, are divided and replanted in other beds. Some persons bend the long stems down and obtain layers. When a bed becomes too crowded, another should be formed, and in this way the plants may be propagated to any extent. The best time for transplanting is when growth commences; the new plants should be placed a foot and a half apart, and when well surrounded with earth they should be watered. Always select moist weather, and, if possible, have a ball of earth to each plant.

Gathering the Tchou-ma. The crop is gathered three times in the year; the stems of the second crop grow much faster than the others, and is by far the best. After the crop, the stocks of tchou-ma are covered with manure and immediately watered.

Steeping and Bleaching. Tie up the stems in little sheaves, and place them on the roof of a house, in order that they may be moistened by the dew at night, and dried again by the sun in the day. In five or seven days they become white, but if exposed to rain they immediately turn black. There are several other methods of bleaching and preparing the stalks; when thoroughly white and clean, the fibres are joined end to end on the wheel, so as to make long threads, which form the warp and woof, and are manufactured into stuff in the usual way.—*Jour. Hort. Soc.,* vol. iv., p. 236.

Cultivation of Brunsvigia Josephinæ. *By Charles Leach, King's Road, Clapham Park.* In March, 1844, I received three fine bulbs, among various others, of Brunsvigia Josephinæ, from the Cape. They were at once potted in good fresh turfy loam. In November the leaves become yellow, and water was withheld, but was resumed in December, when new leaves began to appear; they were also plunged in water for a few hours, to ensure the balls of earth being saturated; the top mould was also removed and replaced with leaf mould. During the winter they were kept in a warm greenhouse, in a temperature often down as low as 35°. The flower-stems are always cut off as soon as the last flowers begin to wither. The pots are then placed out of doors, and are allowed to remain as late in the autumn as possible.—*Jour. Hort. Soc.*, vol. iv., p. 273.

Rasamala Forest in Java. The beautiful and conspicuous *Rasamala forest* is remarkable in the western mountains of Java. It derives its name from an indigenous tree, which seems to belong to the genus Liquidamber, and furnishes a storax. Noronha described it under the name of Altingia excelsa. Its beautiful tall, straight, whitish trunk, less overgrown than those of the fig-trees, and with a more regular head of light-green foliage, marks the wooded region which received its character from this useful tree. Thick thorny bushes, many kinds of Calamus, and a great variety of Chinchonaceous plants, remarkable for their peculiar and powerful exhalations, which are perceived at a distance, form the copse-wood of this aromatic forest.—*Jour. Hort. Soc.*, vol. iv., p. 232.

The Ferula of the Ancients. M. Von Heldreich has presented for the Museum at the Royal Gardens at Kew, a portion nearly 4 feet long and 3 inches in diameter, of a stem of the true Ναρθηξ of Dioscorides (*Ferula* communis), or the *Ferula* of the ancients, and of which it is remarked by Tournefort that it preserves its old name among the modern Greeks, who call it "*Nartheca.*" It bears a stalk 5 feet high and 3 inches thick. At every 10 inches there is a knot, and it is branched at each knot. The bark is hard, two lines thick; the hollow of the stem is filled with a white medulla, which, being well dried, takes fire like a match. The fire holds for a long time, slowly consuming the pith, without injuring the bark, and the stem is therefore much used for carrying fire from place to place. This custom is of the highest antiquity, and may explain a passage in Hesiod, where, speaking of the fire that Prometheus stole from Heaven, he says that he brought it in a *Ferula;* the fact being, probably, that Prometheus invented the steel that strikes fire from flint, and used the pith of the *Ferula* for a match, teaching men how to preserve the fire of these stalks. The stem is strong enough to be leaned upon, but too light to inflict injury in striking; and therefore Bacchus, one of the greatest legislators of antiquity, commanded that men who drank wine should carry staves of this plant, with which they might, during intoxication, smite each other, and yet not break heads. The priests of this deity supported themselves on sticks of *Ferula* when walking. The plant is now chiefly employed for making low stools; but very different were the uses to which the ancients applied the *Ferula.* Pliny and Strabo relate, that Alexander kept Homer's work enclosed in a casket of *Ferula,* because of its lightness. The body of the casket being made of this plant, was covered with rich stuff or skin, adorned with ribs of gold, and studded with pearls and precious stones.—*Jour. Bot.*, 349.

Aquatic Vegetation. In aquatic vegetation, where the leaves float, the air orifices are on the upper surface as in the *Nymphæa* and *Nelumbium*; but in some plants that inhabit a watery medium, there will be found two distinct systems of leaves, as in the water Ranunculus (*R. aquatilis*); those that are constantly submerged are finely divided, and those that float, or emerge, are more entire. In this class of plants there is a singular analogy to amphibious animals, or such as have two sets of respiratory organs, namely, the pulmonary apparatus called lungs, and the other termed *bronchiæ*, or gills, as in fishes, for leaves are real respiratory organs.

Truly amphibious animals, however, certainly compose a limited number, and the *Proteus sanguineus* of the caves of Carniola, with the *Siren lacertina,* and *Meopoma gigantea* of the New World, are remarkable examples. Many plants that belong to marine vegetation are affixed to rocks, or cemented to the shells of crustaceous or testaceous animals, and of course travel with them, but a great many seem vagabond, and float hither and thither, having "no abiding-place," and numerous examples have been cited. The *Pontederia crassipes* floats in the tanks of India by means of bulbs,* that are real buoys.

The *Confervæ* are mostly under water, and have narrow or grass-like leaves. The *Conferva bullosa* is rendered buoyant in its foliage by vesicles inflated with oxygen elaborated by the sunbeam.

The *Callitriche aquatica,* or water star-grass, floats until the period of its inflorescence, when its cells exchange their aerial contents for water, and thus by a change in their specific gravity the plant sinks to the bottom and becomes stationary in the mud. The curious arrangement by which the successively prolonged inflorescence of the water-crowfoot (*Ranunculus aquatilis*) is preserved above the surface is sufficiently interesting.

As soon as the petals drop, the branch is gradually withdrawn from the surface to mature its seeds below; the exchange of specific gravities to suit specific purposes, is not the least singular among the phenomena of aquatic vegetation.

At early dawn the white water-lily, *Nymphæa alba,* raises its head above the surface, expands its elegant blossom, and gradually elevates its stem some inches from the water; as the day declines, the footstalk contracts, the flower closes, and it nestles half-immersed during the night. Thus the loss of temperature which the plant would incur from radiation, is compensated for by that of a medium which remains comparatively uniform. This beautiful phenomenon in reference to the sacred *Lotus* of the Ganges,

"Flower of the watery plain,"

and once, though not now an associate of the "Father of rivers," thence called the Rose of the Nile, appears to have been early observed, and is recorded by Herodotus.

Perhaps this circumstance, conjoined with other peculiarities, endeared it to aboriginal Egypt, for we find that it crowned their columns, was sculptured in their temples, and associated with their gods. The tubers interwoven with the fibres of the root, as well as the seeds of the *Lotus*, were the food of numbers, and the Egyptian *Lotophagi* hence received their name.

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* The gaseous matter in the inflated bulb-like stems of *Pontederia crassipes* is said to contain no carbonic acid gas, but more oxygen than in atmospheric air.

The method employed in sowing the seeds of the *Lotus* was very curious, and according to Dr. Royle in his "Flora of Cachmere," is still practised in the peninsula of India by certain tribes. The seed, enveloped in a ball of earth, is thrown on the surface of the stream, where it floats for a few moments, until becoming specifically heavier by the absorption of water it sinks to the bottom, and in due time the plant rises above the surface, spreads its leaves and unfolds its flower. It affords a beautiful illustration of a passage in the Sacred Writings; —"Cast thy bread upon the waters, and thou shalt find it after many days."

The seed vessel of the *Lotus* resembles half a lemon, with cavities that would each contain a small hazel nut; its form is somewhat assimilated to the rose of a watering-pot.

The pericarpium of the *Nelumbium flavum* gives a good idea of this curious receptacle.

Snakes slumber on the floating leaves of the *Nelumbium speciosum*, and aquatic birds, especially the long-toed Chinese *Jacana*, trip gracefully over them, and sometimes build their nests in the cavities: some aquatics form so dense a mass of foliage and stem as to bear a person walking on them. *Economy of Vegetation.*

PLANTS FIGURED AND DESCRIBED IN THE LEADING BOTANICAL PERIODICALS FOR NOVEMBER.

Azalea ramentacea. A pretty and distinct species, received by the Horticultural Society from Mr. Fortune in May, 1846, and said to be from Hong-kong. It has something of the aspect of the common white Chinese Azalea, but with smaller flowers, and forms a dwarf evergreen shrub, requiring the same kind of treatment as other species of Chinese Azalea; and is easily increased by cuttings in the usual way.—*Jour. Hort. Soc.*, vol. iv., 291.

Cycnoches barbatum. From Mrs. Lawrence's rich collection at Ealing Park, recently imported from Costa Rica. It is a singular and handsome plant, with the sepals and petals dull yellow, spotted with purple. It will, probably, require to be grown in turfy peat, in pots well drained, and kept in the cool division of the Orchid house.—*Bot. Mag.*, 4479.

Dendrobium tortile. A native of Moulmain, imported by Messrs. Veitch through their collector, Mr. Thomas Lobb: exhibited at the Horticultural Society's rooms in 1847. The flowers are large and handsome, the sepals and petals being white, and delicately tinged with purplish-rose. The plant appears to be of rather a weakly habit, but its flowers render it interesting in every collection of Orchids. It will thrive attached to a block of wood, or on a sod of Sphagnum moss, in a warm stove.—*Bot. Mag.*, 4477.

Echeveria farinosa. A sufficiently hardy species to live in a cold pit or frame from which frost is excluded, and easily increased, either from seeds or cuttings. It is a native of California, and was introduced by the Horticultural Society through Mr. Hartweg. The flowers are pale-lemon colour, and not very ornamental.—*Jour. Hort. Soc.*, vol. iv., 292.

Echeveria laxa. A succulent plant, with yellow flowers, like those of *Sempervivum arboreum* in appearance. It is a native of woods near Monterey, in California, whence it was sent to the Horticultural Society by Mr. Hartweg. It requires a cool greenhouse, but is not worthy of a place in a collection of ornamental plants.—*Jour. Hort. Soc.*, vol. iv., 292.

Heliconia angustifolia. A very handsome and rather dwarf species, introduced by Mr. Henry Shepherd to the Liverpool Botanical Gardens, from Brazil. It flowered in January, 1846, when its beautiful bright-red spathas, deep orange-coloured ovaries, and white sepals tipped with green, had a very handsome effect. The present may be considered a dwarf species of the genus, as it does not attain more than between three or four feet in height. It requires to be kept in the stove, and grown in a large pot, planting it in light loam and supplying it freely with water during summer.—*Bot. Mag.*, 4475.

Lisianthus princeps. Some idea may be formed of the beauty of this plant from the following dimensions of one of its flowers: The cup of the calyx is half an inch deep; the corolla is five inches long, and rather more than an inch wide in the thickest part. These flowers hang on long terete stalks singly from the axils of the leaves. It is undoubtedly one of the finest things in cultivation.—*Jour. Hort. Soc.*, vol. iv., 261.

Pogostemon Patchouli. *The Pucha-Pat* or *Patchouli* of India. The dried tops of this celebrated fragrant plant, as well as the essence, or alcoholic solution of the oil, are placed in the Museum of the Royal Gardens, and the living plant is seen in the stoves. Under the above names are imported into this country (only within the last seven years) the dried foliaceous tops of a strongly odoriferous plant, called, in Bengalee as well as in Hindoo, *Pucha-pat*. The dried tops imported into England are a foot or more in length. The odour is strong and peculiar; I cannot call it agreeable, though some others do, while many persons regard it as disagreeable. By distillation it yields a volatile oil, on which the odour and remarkable properties depend. In Europe it is principally used for perfumery purposes. *Sachets de Patchouli* are sold in the shops. They consist of a few grains of the coarsely-powdered herb, mixed with cotton-wool, and folded in paper. Placed in drawers, chests, &c., they are said to drive away insects from linen, shawls, &c. An *Essence de Patchouli* is used by perfumers, principally for mixing with other scents in the preparation of compounded perfumes; for this purpose it is considered very useful. In India it is used as an ingredient in tobacco, and for scenting the hair of women.—*Journal of Botany*, 328.

Rhododendron Clivianum. This is one of a very remarkable set of hybrid Rhododendrons produced by the care and skill of Mr. Iveson, head gardener at Syon, and it was named by Dr. Lindley at the exhibition-rooms of the Horticultural Society, in compliment to her Grace the Dowager Duchess of Northumberland. It is one of the most delicate and beautiful kinds of Rhododendron yet in cultivation. The flowers are white, with crimson spotting, and the plant is perfectly hardy, but unfortunately flowers too early for our climate; but as it makes a fine appearance, it is well worthy of protection while in flower.

Schomburgkia tibicinis; grandiflora. Dr. Lindley considers this a variety of the *S. tibicinis* of Mr. Bateman's splendid work on the "Orchideæ of Mexico and Guatemala;" but it would, perhaps, be more correct to consider it the perfect state of the plant, such as it assumes in its native woods (Honduras), and such as good cultivated specimens exhibit in our stoves. The natives use the hollow stems or pseudo-bulbs as a horn or trumpet. These stems harbour insects, too, in great numbers. Mr. Bateman tells us that "Mr. Skinner, its original discoverer, was not permitted to obtain quiet possession of the first flowering specimens he saw; for swarms of fiery ants issued forth in thousands from their snug retreat to repel the spoiler, and inflicted pangs which none but the most ardent naturalist would have braved." This is rather a slow-growing epiphyte, requiring the temperature of a warm Orchid house.—*Bot. Mag.*, 4476.

Stanhopea tricornis. A very remarkable species, sent to Mr. Skinner by Mr. Waresiewitz, at one of whose sales it has been dispersed. The figure of the lip is most remarkable, there being a third horn at the base of the middle lobe of the lip, in addition to the two always present at the side. The petals are said to be pink, and the rest of the flower white; the petals, moreover, are very fleshy, firm, and apparently incapable of rolling back as the rest of the genus. It is a native of the western coast of Peru.—*Jour. Hort. Soc.*, vol. iv., 263.

Vagaria parviflora. A tender bulbous plant, received from Bogota by C. B. Warner, Esq., and by him presented to the Horticultural Society in October, 1847. The scape, which bears an umbel of about five flowers, is the same height as the leaves. The flowers are small, and white with a greenish tube. The plant forms a neat, but not very showy object; it requires the protection of the greenhouse, and the same treatment as that given to Amaryllis.—*Jour. Hort. Soc.*, vol. iv., 298.

CALENDAR OF OPERATIONS FOR DECEMBER.

FRUIT AND VEGETABLE DEPARTMENT.

Glass.

Grapes still hanging on the vines must be kept free from damp and mould; this is accomplished by a free circulation of air; and a little fire being supplied in the daytime in damp or very dark weather. Vines in pots or tubs, which were brought in last month, will now be breaking, deal very gently in point of heat, and take care that the atmosphere is not too dry.

Kidney Beans may be planted in pots about the end for the first crop, place then in warm situations near the glass.

Mushroom Beds in sheds must now have a good share of attention, so as to keep the beds in a successional bearing state all through the winter.

Pines will now seldom require watering, through this month at least; in other respects, follow the directions given in the two previous months.

Strawberries in pots should at the end be introduced into the forcing houses for an early crop; but more fruit is secured from those which are not started until the end of January.

Sea Kale, Asparagus, Rhubarb, &c., should also be coming on for use about Christmas.

Vines which have lost their leaves, and the wood is ripened, should be pruned, and when the old coarse bark is removed, should be dressed with a mixture of fresh lime and water laid on with a painter's brush.

Open Air.

Prune, trench, collect composts, wheel manures, mulch, and get every thing as far as possible for spring.

FLOWER DEPARTMENT.

Glass.

Conservatory and Greenhouse. The various kinds of winter flowering plants will now make a very fine display, as Camellias, Plumbagos, Epacrises, Indigofera decora, Chrysanthemums, and many other kinds; if a little clear liquid manure was occasionally supplied, it would be an advantage. With respect to general treatment, little need be added to what was said last month. If the weather prove severe, give a little fire, but refrain from this unless there is a real necessity, for all New Holland plants, and the greater part of the Cape shrubs, suffer from its use.

Stove and Orchid-house. In this department, several good things will be in bloom, Euphorbia jacquiniflora, Poinsettia, three or four kinds of Gesnera, Ixora coccinea, and other species; every thing which is now sinking into repose, as Achimenes, Gloxinias, Erythrinas, Clerodendrons, &c., &c., should have every assistance by withholding water, and removing to cooler situations. In the Orchid-house take care of drip, and give a moderate temperature to all species at rest; any making their growths, or flowering, must be supplied with the requisites for those states.

Forcing Pit. Introduce Azaleas, Daphnes, Hyacinths, Honeysuckles, Kalmias, Narcissi, Persian Lilacs, Rhododendrons, Rhodoras, Sweet-briars, Roses, Tulips, and many other things, at once into a moderate heat, and their flowers will begin to expand shortly after Christmas.

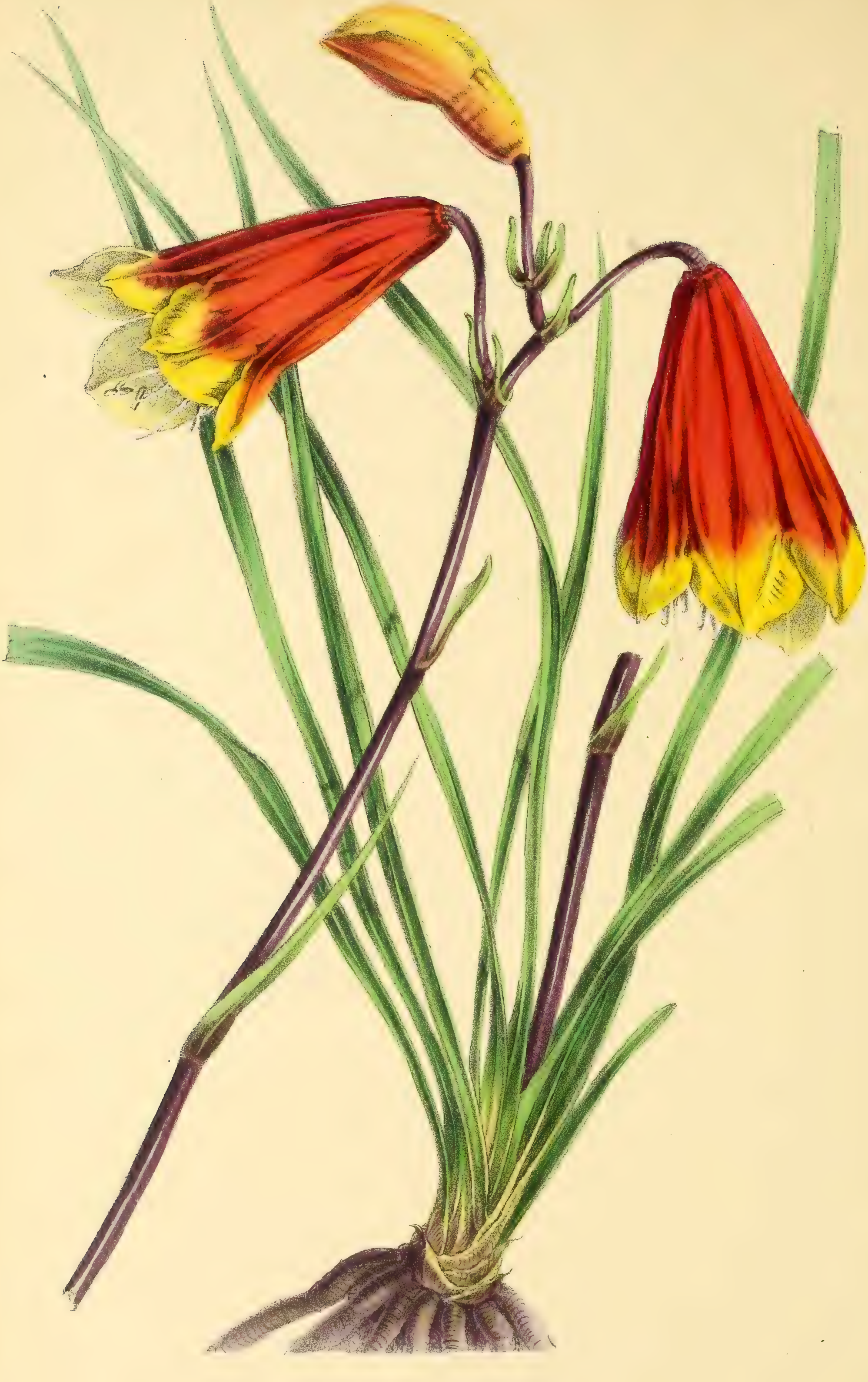
Cold Pit. Protect in these structures all kinds of half hardy stock for flower garden purposes next year. Keep them free from dampness, either of foliage or atmosphere, be very moderate in the supply of water to the soil, and see that all are well drained. There is nothing more conducive to the well-being of the whole than a free circulation of air, and general cleanliness.

Open Air.

Trim all plants on the borders; protect every thing which requires it with mats, and place a quantity of dry porous material over the roots of plants rather tender; if any rather tender plants become frozen, either in-doors or out, do not allow them to thaw suddenly; the more gradual this is effected the better, as the tender vessels are replete with frozen water, any violent change will produce a rupture, which will be fatal to the branches, if not to the plants themselves. In bad weather prepare composts in the sheds, make labels, prepare sticks and trellises, clean plants, and keep every thing in-doors in order.

FOREST DEPARTMENT.

Planting may proceed as rapidly as possible, and as soon as this is completed, pruning and thinning will succeed. See that all the drains are open and in good condition.



S. Holden, del. & Lith.

Blandfordia flammea.

PAXTON'S

MAGAZINE OF GARDENING AND BOTANY.

BLANDFORDIA FLAMMEA. (Flame-flowered Blandfordia.)

Class, Hexandria.——*Order*, Monogynia.——*Nat. Order*, Liliaceæ.——(Lilies, *Veg. Kingd.*)

Generic Character.—*Corolla* tubular, with a six-lobed mouth, perishing. *Stamens* lying on the tube. *Anthers* affixed to a base in the form of an extinguisher. *Style* subulate. *Stigma* simple. *Capsule* prism-shaped, divisible into three compartments, each of which opens at the interior angle. *Seeds* in two rows, inserted at the edges of the suture; outer coat loose, pubescent.

Specific Character.—*Plant* an evergreen herbaceous perennial, growing under favourable circumstances to three or four feet high. *Leaves* pale green, linear-lanceolate, acute, six to nine inches long. *Scape* growing to the height of from ten inches to four feet, slender, of a purple colour. *Flowers* few, three or four on each scape, pendulous, with two small bracts at their base. *Perianth* orange-red, tipped with yellow, and the interior a bright orange yellow; limb composed of six segments, of which the outer ones are ovate and obtuse, the inner broader and retuse.

Authorities and Synonymes.—Blandfordia flammea, *Dr. Lindley's MSS.*

Our drawing of this very handsome species of Blandfordia was made from a specimen which flowered in the possession of Messrs. Low and Son, Nurserymen, Clapton, in October, 1849.

It is a native of Australia, whence it was introduced by the above gentlemen, along with Blandfordia nobilis and grandiflora, through a friend in Sydney, who himself discovered our present subject growing on the banks of the Hunter river. Although in a living state the plant is quite new to our collections, it has been known for some years in a dried state, Dr. Lindley having specimens four feet in length in his possession, received from Port Stephens.

It is a very desirable greenhouse species, continuing to produce its flowers for several weeks together; it is tuberous-rooted also, and preserves its foliage throughout the winter, and its blossoms are elegantly disposed, and of a rich and very showy colour.

The treatment usually given to Cape bulbs, will in a great measure be suitable for this plant; but as the soil in which the plant grows will require watering, more or less, all the winter, it will be necessary to add a little more heath-mould than is used for bulbs, and the pot should be placed in a dry airy part of the greenhouse. It will no doubt also thrive well planted out in the border of a conservatory.

The generic name was given by Sir J. E. Smith in honour of the Marquis of Blandford, a great patron of botany.

Increase is effected by division of roots.

RONDELETIA SPECIOSA MAJOR. (Showy Rondeletia, *large variety.*)

Class, Pentandria.——*Order,* Monogynia.——*Nat. Order,* Cinchonaceæ.——(Cinchonads, *Veg. Kingd.*)

Generic Character.—*Calyx* with a sub-globose tube, and four or five-parted limb; lobes oblong-linear, acute, permanent. *Corolla* with a cylindrical tube, which is hardly ventricose at the apex, and a four or five-lobed spreading limb; lobes roundish. *Anthers* four or five, sessile at the top of the tube, inclosed. *Stigma* bifid. *Capsule* globose, crowned by the calyx, two-celled, dehiscing from the apex into two valves, which are usually cleft at the apex, whence it sometimes appears four-valved; but usually dehiscing at the cells, rarely at the dissepiment. *Placentas* central. *Seeds* numerous, small, ovate, angular, usually only two in each cell at maturity.

Specific Character.—*Plant* a compact, dwarf shrub. *Stamens* smooth, erect, branching, yellow green, slightly coloured with rose-colour when young, afterwards becoming red, and, finally, when the wood is old, of a reddish brown. *Leaves* obcordate, that is, betwixt oblong and heart-shaped, acute, opposite, dark glossy green on the upper side, paler, and often slightly tinged with red on the under. *Flowers* terminal, in corymbs, very showy. *Calyx* five-parted; segments acute, yellowish green, tinged with red. *Corolla-tube* three times the length of the calyx, rose-coloured; limb five or six-parted; lobes rounded, very rich orange red, darkest at the extreme edges, and becoming lighter towards the centre of the flower; centre of the flower bright orange yellow; eye dark crimson.

Variety Major.—*Leaves* smaller than the species, and the flowers much larger in size.

Authorities and Synonymes.—Rondeletia, *Blume, Plumier's Gen.* t. 12; *Lin. Gen.*, 220; Rondeletia speciosa, *Loddiges' Bot. Cabinet; Paxton's Mag. Bot.*, 2 t. 242. Rondeletia speciosa major of the nurseries.

The original species is a native of the Havannah, whence it was received at Hackney in 1830 through W. J. Mac Leay, Esq. The flowers of this variety are exceedingly rich in colour and much larger than the parent; it makes, when in flower, a most striking appearance. Of its origin we are quite ignorant, but suppose it to have been an introduction of more recent date than R. speciosa.

The heat of the stove is required to grow it to perfection, and if potted in peat and loam and carefully managed, a profusion of flowers will be produced for several months in the year. It is increased by cuttings planted in sand, and covered with a glass in heat.

Our drawing was made in October 1849, from a specimen blooming in one of the stoves at Chatsworth.

The generic name is given in honour of a physician named Rondelet.

TABERNÆMONTANA CORONARIA FLORE PLENO.

(Double-flowering Garland Tabernæmontana.)

Class, Pentandria.——*Order,* Monogynia.——*Nat. Order,* Apocynaceæ.——(Dog-banes, *Veg. Kingd.*)

Generic Character.—*Calyx* five-parted. *Corolla* salver-shaped; *limb* five-parted; *segments* unequal-sided. *Stamens* inclosed. *Anthers* sagittate, cohering to the stigma. *Ovaria* two. *Style* filiform. *Stigma* bifid from the dilated base. *Hypogynous glands* wanting. *Follicles* two, ventricose. *Seeds* immersed in pulp.

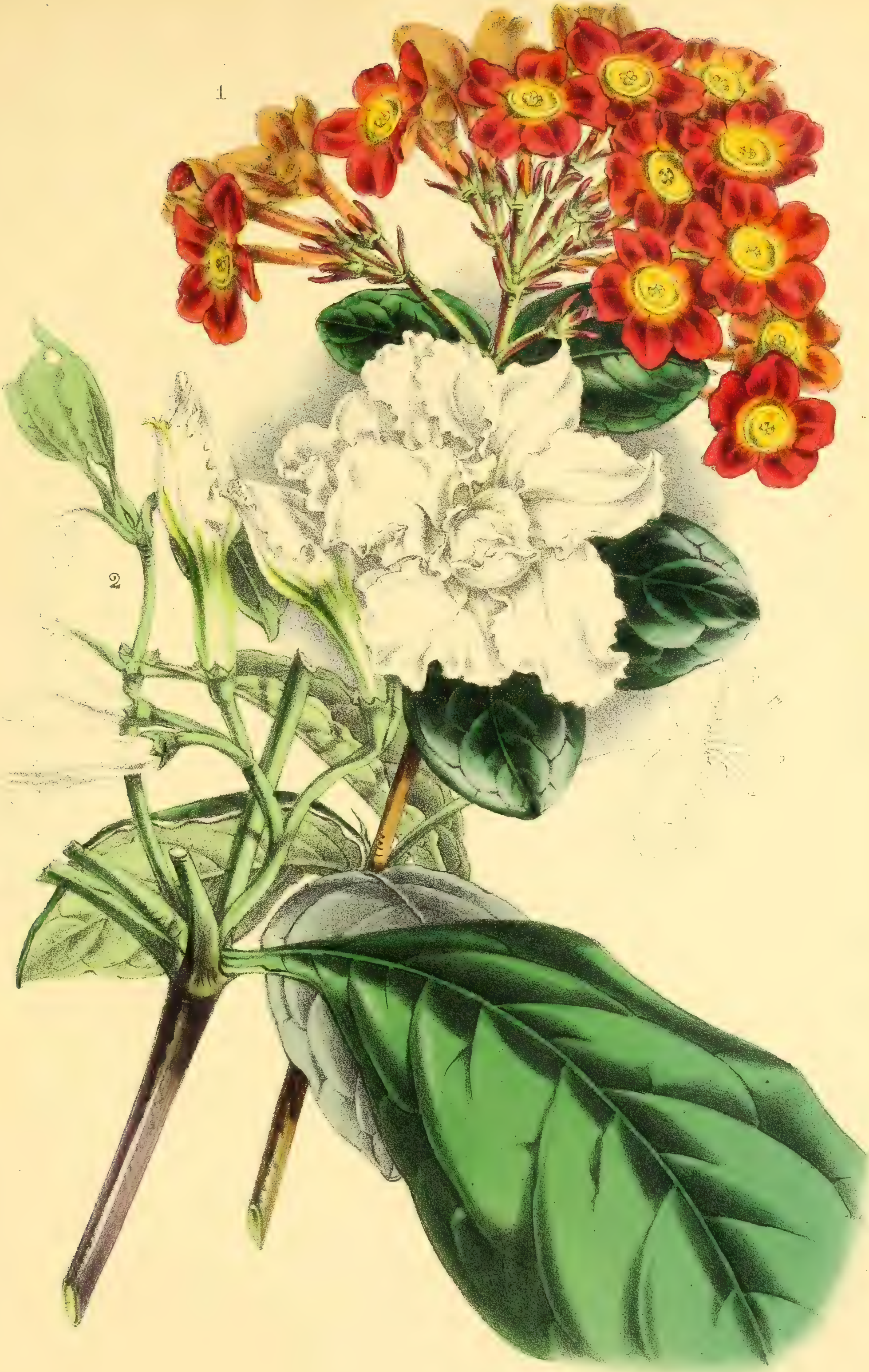
Specific Character.—An evergreen shrub growing four or five feet high, with grey bark and divaricate branches. *Leaves* opposite, oblong-lanceolate, bluntly acuminated, thin, shining, smooth. *Peduncles* axillary, two to four-flowered, smooth, erect, shorter than the leaves. *Flowers* pure white, with a yellowish tube, scentless. *Calyx* small, campanulate, with rounded teeth, which are very short, and overlap each other. *Corolla* large, white, salver-shaped; *tube* slightly ventricose towards the base, tinged with greenish yellow; *limb* flat, with falcate, obtuse, entire segments; wavy at the edges. *Stamens* inserted below the middle of the tube. *Stigma* slightly two-lobed.

Var. flore pleno.—*Stamens* converted into petals forming a fine double flower, larger than the species, and very sweet-scented. In other respects, the characters agree with the species.

Authorities and Synonymes.—Tabernæmontana, *Plumier's Gen.*, 30; *Lin. Gen.*, 301. Tabernæmontana coronaria, *Lodd. Bot. Cab.*, 406; *R. Br. Willd.* Tabernæmontana coronata *of the Nurseries.* Nerium coronarium, *Bot. Mag.*, 1865; *Aiton Kew.*, i., 297; Nerium divaricatum, *Willd. Sp. pl.*, 1236.

This fine old plant has long been an inhabitant of our stoves, and chiefly known as *Nerium coronarium.* It has, however, for some years past, been acknowledged as a double variety of *Tabernæmontana coronaria.* It differs from the species, both in the larger size of the flowers, the wavy edges of the segments, and the delicious fragrance which it emits when in bloom.

The plant is a native of the East Indies, from whence it was originally introduced in 1770, but is much less grown even now, than its merits deserve. It requires the heat



S. Holden, del & Lith

1 *Rondeletia speciosa major.*
2 *Tabernæmontana coronata flor. plen.*

of the stove at all times; and, if judiciously treated, flowers several months in the year. The soil requisite for its successful cutivation, is a rich loam, well drained, and rendered open by the addition of a little turfy peat. Increase is effected by cuttings of the ripened wood planted in a mixture of sand and peat, and covered with a glass.

Our drawing was prepared in October, 1849, from a plant blooming in one of the stoves at Chatsworth.

The generic name was given by Plumier, in honour of Tabernæmontanus, a celebrated physician and botanist.

CHEMISTRY OF HORTICULTURE.—NATIVE OR SPECIAL EARTHS.

By John Towers, Esq.

(Continued from Page 326).

These, to be understood, must be minutely investigated, and their qualities, if possible, accurately determined. We must carefully distinguish between Earths proper, and Soils rendered fertilising by combination with substances capable of undergoing decomposition. The earthy bodies to which the reader's immediate and exclusive attention is directed, are sand, or silex—alumina the base or matter of pure clay—chalk, already treated on—as lime chemically united with carbonic acid, and iron united with oxygen, and thereby brought into the state of an oxide. These four earths—for so we conventionally call them—constitute the basal elements of fertile land, the two first, pre-eminently so.

1. Sand, if pure, is identical with rock crystal. In chemical language it is called Silica, and is proved to be the oxide of a metallic body, *Silicon*, never found in nature. But this earth of silicon, *silica*, is found very extensively, and is the agent by which the texture of all clays and loams is modified. Silica is in itself insoluble in water, therefore it cannot enter the plant as a portion or component of the sap; yet silica does exist in vegetable bodies, and very copiously in the cereals and fodder grasses, the outer coating (epidermis) of which is, as it were, a plate of glass. Silica consists of

1 equivalent of Oxygen, numbered	8
1 equivalent of Silicon, also numbered	8
The particles or atoms, being in weight equivalent to	16

It is, I have said, insoluble; it has no taste, and yet exerts an agency so remarkable in many instances, that many chemists have classed it with acids. Thus with potash and with soda, it unites and forms the silicate of potash and of soda; with oxide of lead, silicate of lead: and these are constituents of glass. With silica, alumina, and magnesia, we obtain a china and porcelain body; and in old mortar there is reason to believe the siliceous sand employed is chemically united with lime, as a true silicate of lime—an indestructible cement. From these data we arrive at the conclusion that silica, or the matter of flint and sand, is enabled to pass through the absorbents of roots *as a soluble silicate of potash*, and potass is proved to exist in many rocks. Hence the soils which are formed in process of ages by the action of air, water, and electricity upon their most exposed surfaces, has contained a proportional quantity of that mineral alkali.

In further proof of the chemical affinity or combining energy, which exists between silica and certain bases, with which it forms *neutral silicates*, the following items are selected from a table given by Professor Johnson of the composition of a clay analysed by one of his assistants. In 100 parts of such clay there were found, of—

Insoluble Silicate of Alumina	11·32
„ „ Protoxide of Iron	2.74
„ „ Peroxide of Manganese	a trace
„ „ Lime	0·76
„ „ Magnesia	0·58
„ „ Potash	0·96
„ „ Soda.	0·24
	16·60

This combining power may be referred, I think, to the electric condition of the two elements; for if silica be in a state of electricity opposite to that of any alkaline or earthy base with which it combines, the union will be correctly electro-chemical, and in conformity with that attractive energy which induces the two electricities to neutralise each other.

2. *Alumina—argil.* Argillaceous earth is the base of all clays, constitutes the larger portion of them, and confers that plasticity and adhesiveness which denote their peculiar character. Alumina is an oxide of a metalloid called aluminum, first discovered by Davy, in 1808, but not properly defined till 1827, when Wöhler obtained it from its chloride, in a perfectly separate state. Alumina, pure, is most readily obtained from refined alum, dissolved in distilled water, then decomposed by adding a filtered solution of carbonate of potassa (salt of tartar) to excess. The precipitate so obtained, is washed with repeated portions of hot distilled water, and re-dissolved in hydrochloric acid (muriatic acid or spirit of salt). It is again precipitated by liquor of ammonia, or its carbonate; and the alumina so deposited, is again washed on a paper filter till perfectly free from saline matter, after which it is dried with a gentle heat. It is then a hydrate of alumina, that is, alumina with about half its weight of water, in a dry form. This water is driven off at a red heat, leaving the alumina pure, in the state of a soft, colourless, insipid, insoluble powder, the specific gravity of which, compared with distilled water at 60° Fahr. is 2. Alumina retains a strong affinity for the water so expelled, absorbing it when exposed to air, to the extent of half its own weight.

Though not found native in the condition above described, it is nevertheless widely diffused throughout the earth. "Native alumina may be said to constitute the sapphire, which is either colourless or pale blue, also the oriental ruby and topaz, which are red and yellow varieties of sapphire. These gems are mostly found in alluvial deposits in Ceylon and Pegu. Corundum, adamantine spar, and emery, are minerals also, consisting chiefly of alumina, with less than 2 per cent of oxide of iron, and a little silica. All these substances are extremely hard, being in that respect, only second to the diamond."—*Brande.*

The reader will find the best representative of alumina in tobacco-pipe, or potter's clay. It is not pure alumina, because it contains a considerable percentage of silica, in however, so fine and impalpable a state that none of it subsides when 200 grains are intimately mixed by trituration, and boiled with four or five ounces of distilled, or rain water.

From the recent investigation of Professor Johnston, printed in the *Journal of Agriculture*, No. 27, July 1847, we collect much useful information. For example, "On the General Composition of Plastic Clays," it is stated, that "pure pipe or porcelain clay is the standard with which all other plastic clays are to be compared. In its best and purest form, this clay—besides water—consists of silica and alumina only. A specimen from Devonshire, gave in the 100 parts—fine silica, 49·6; alumina, 37·4; combined water 11·2. When the proportion of silica is much smaller—say only 19 per cent—(provided it exist in a state of chemical union with the alumina) it will produce a clay sufficiently plastic for all common mechanical purposes." But even porcelain clays are rarely pure: they contain an appreciable quantity of oxide of iron, of lime, of magnesia, of potash, and soda."

What then must we say of the ordinary tile-clays, on the one hand, and of the clay soils of agriculture, on the other? Space is not given to cite the authority of Mr. Henry Stephens' "Book of the Farm" on the constituents of agricultural clays; we must be content to offer a cursory view of different heads under which they are now classed. Thus:—

(*a*) Strong clay soil consists of from 5 to 15 per cent. of siliceous sand; it abounds with alumina, coloured with iron, which confers upon it every tint, from pale buff to chocolate brown, according to its state of oxidation. Such a clay-soil, comprising perhaps 60, or even a higher proportion of alumina, is when fully wetted, greasy to the foot, which slips upon it backwards, forwards, and sideways. It has an unctuous feel in the hand, by which it can be kneaded into a smooth, homogeneous mass, which retains the shape given to it."—*Stephens.*

The leading characters of all soils are derived from only two earths, clay and sand, the greater or less admixture of which stamps their peculiar character; for the properties of these earths are also found to exist in purely calcareous, and purely vegetable soils."—*Idem.*

(*b*) A clay loam combines, we may say, from 15 to 20 per cent. of siliceous sand with as much alumina in it; but these calculations are to be received with caution, because the free-working or clodding of the loam, depends much upon the state and texture of the sand. It is no uncommon circumstance, that where the sand consists of a gritty gravel, a very large proportion of it shall be found in a state that can be separated by washing with water, and yet will permit the land to bind and clod after being wet; insomuch, that it cannot again be worked till penetrated by more rain. Such an earth, with perhaps 60 per cent or more of sharp, abounds in part of Berkshire, and demands the nicest attention on the part of the farmer. Coal-ashes, which contain much dry alumina and silex, afford the most effectual remedy in such cases.

(*c*) If the silica be in a fine silky state, from 40 to 60 per cent. of it will constitute a free working, and yet unctuous loam.

(*d*) Marls combine a considerable per centage of chalk; thus, if a loam contain in 100 parts—

Water of Combination . . .	9	parts	
Carbonate of Lime	14 to 20	„	
Siliceous Sand	37 to 40	„	separable by water
Clay, with fine Silex . . .	37 to 40	„	the latter in a state of chemical union with the alumina

a genuine marly loam will be the result. I say nothing now of organic or any putrescent matters which always are present in fertile loams, and must form the subject of future investigation. At present our inquiry refers only to the basal, insoluble elements of the land: and such indeed, are also chalk, and oxide of iron. Of the former, enough has been written in a former article, combined with the above remarks on Marl (*d*). Oxide of iron, if as a perfect—or a per-oxide—(1 equivalent of the metal with 1½ of oxygen) is innocuous and insoluble, and always present in the rich brown earths.

Having thus taken a general, though cursory glance at the bases of all good land; setting aside, for the sake of argument only, the other elements, saline, vegetable, and animal, which are susceptible of dissolution and organic mutations, the grand question now presents itself,—what office do those principal basal earths perform? And again, do they—can they—nourish a plant? or, do they merely afford a matrix—a bed wherein the roots may fix themselves, find support, and wander in all appropriate directions in search of food? These questions involve considerations of deep interest, for, although it is impossible to suppose that any land, however poor it may be, is entirely void of any particle of decomposable fibrous or saline matter, yet we have authority to believe that trees—mere seedlings, have been planted in pots of not large dimensions, filled with the simplest maiden earth, and watered only with the purest water, which have grown to an amazing size, and to all appearance without abstracting anything from the earth, to the extent of $\frac{1}{100}$th part of the wood produced. The earth, in one instance, was accurately weighed, the surface of it covered with lead, perforated so as just to allow the equal distribution of the water; and yet, at the expiration of several years, the tree had gained enormously, while the loss of weight in the soil, amounted to a mere fraction. Are we then to conclude that trees acquire all their growth from the air, through the channels, or oscular pores of their leaves? Experience in culture repudiates the assumption; yet facts in favour of it are rather cogent. I will resume this subject—connected with manure—hereafter; but in closing this article I may notice the case of two plants of Arbor Vitæ in a neighbour's balcony, 4 or 5 feet high, which appear to me to have remained there winter and summer, without any change of circumstances: they are full of foliage and so they were in 1847, and I think long before that period. These shrubs stand as screens only, and effectually do they obstruct the ingaze of passers-by. But how do they live and thrive? The aspect is north, and the traffic of the road prodigious. I have written enough perhaps, to excite curiosity and reflection; and if so, the reader's mind will not be unprofitably employed.

FLORICULTURE.

By John Dickson, Acre Lane, Brixton.

Pelargoniums.—There is no race of flowers that affords more extensive gratification than the Pelargonium. Every rank in society appears to entertain nearly equal admiration for these lovely flowers; and whether we trace this idolatry in the humble artisan's wife, who positively worships the trusses of scarlet bloom as they display themselves above the horse-shoe foliage of her pet, and perchance only plant, or regard its effects through all the grades of life in which flowers are loved—(and where are they not?)—the same intense devotion to their beauty will be found to exist. Where localities are not favourable to their cultivation, they will be found in profusion, cut, and placed with care in damp sand, thus exhibiting their beauties to many an admiring eye, at once relieving the sombre hue of apartments otherwise objectionable, and offering pleasure to the possessor beyond description. These innocent recreations multiply rather than diminish, as the love of flowers assumes a higher tone. Let the owners of collections speak their praise, and language will be found weak to express the gratification derivable from so fertile a source. But if we wish to listen to impassioned eloquence, springing from nature's fount, then for a moment listen to the amateur florist, as he expatiates on the treasures in his possession. Mark with what taste (nature's own gift) he points out beauties, describes tints, and pourtrays forms to his less enthusiastic friend, till the ardour becomes contagious, and, from being merely an admirer of others' possessions, the spectator becomes a cultivator of nature's choicest gifts, and revels in pleasures innocent and refined as those which await this extension of Flora's kingdom. Variety spreads her tempting snares, and the amateur florist is lost in the contemplation of such immense prodigality. Selecting, after much consideration, one class of florist's flowers, the cultivator soon wishes for another. Possession in floral life never cloys, nor does continued observation satiate the keen desire for still further enjoyment; and thus it is, Floriculture becomes the absorbing passion of thousands, differing, perchance, on minor points, but agreed in one—*gratitude* to the Giver of all for pleasures that are perchance destined to survive the grave. The love of flowers is born with us, in my belief, and, when circumstances tend to foster the infant passion, it becomes gigantic in its maturity. And it is well that such should be the case, as improvement in our floral statistics is by this means secured, and the few accomplish wonders for the many. Flowers have ever been favourite types of elevated feelings, as well as unerring marks of refined sentiment and natural taste. We are told by Dr. Fielder that the Greeks held Bacchus as the god of flowers as well as trees and of the vine. He dwelt, according to their representations, occasionally in Phyllis, the land of flowers, sometimes on the rose-decked Pangœon, and often in the rose-decked gardens of Macedonia and Thrace, from thence deriving the name Anthios, the flowery. Previous to his being decked with flowers, ivy crowned his head. Venus is said to have crowned him on his return from India. He took the chaplet that Ariadne, in Naxos, had woven from the Theséion, and, walking beneath the sky at night, threw it up to the stars, where it yet shines forth. Many are the beautiful tales identified with flowers; and perhaps were my less classic mythological acquirements brought to bear on the subject, I should be inclined to reverse the picture, and portray the chaplet of old, as thrown earthward by some benignant being, and, shining forth among the brilliant gems of earth, rivalling in number and beauty the glittering spangles of night. But to proceed with the business on which I set out—the cultivation of the Pelargonium. It will be requisite to commence with the soil most proper for the purpose. This should always be in readiness. Turfy loam, refuse of the stables in a thoroughly decomposed state, cow-dung several years old, peat that contains plenty of vegetable fibre, and silver sand, are the principal ingredients. Presuming most of my readers to be in possession of such matters, I shall at once commence the culture of the flowers from the time they are usually sent out by nurserymen, which is most commonly in 4-inch pots. They should at once be shifted into 6-inch size, using plenty of crocks. The compost should consist of about two-thirds turfy loam, as above alluded to.

It is not requisite at this stage of the proceedings to sift the compost; it will be found sufficient to pick out the stones, and rub down any lumps that may appear. Making up the remaining third with peat and silver sand, induce their growth freely, till you find the pots well filled with roots; then allow them repose, giving as little water as possible, but an abundance of air; pinch off the tops of the shoots, leaving about three or four eyes to break from. About the beginning of February shift them into eight-inch pots, using rather fewer crocks, but still sufficient to ensure abundant drainage; let the soil be constituted of three-fourths turfy loam, the remainder silver sand, cow-dung, and bone dust; take the ball of earth, from which a little of the outside has been rubbed, and place it in the pot low enough to bury a portion of the stem, when it is too long. Support and train out the leading shoots to short sticks, and water with a fine rose: keep them close to encourage growth, giving them air whenever an opportunity offers for so doing in safety. Protection is requisite from cold easterly winds, which are certain to injure the appearance of the foliage, if they do no further mischief; they are, consequently, better excluded. I invariably advise fire-heat being withheld as much as possible; in even severe weather, the fire-heat at night should never exceed 45°: pans of water placed on the pipes or flues for evaporation, will be found highly serviceable to the welfare of these plants. In April arrangements should be made for blooming, the most intensely interesting time for the cultivator; the blooming shoots, by this time, should be attached to sticks of the proper length, that is, not higher than the base of the flower-stalk; the amateur bearing in mind the recommendation, that whatever resources art may open to the florist, they are best kept in the back-ground, allowing Nature to engross the first consideration. Effects, not causes, are for the public eye; and however justifiable adorning Nature may be, it will be found more consonant to good taste to keep the means by which such matters are brought about as far removed from observation as possible. The amateur flower-stage should appear clothed, not dressed: there is a wide difference in the signification of these apparently synonymous terms. To continue my subject. The arrangements of the plants on the stage when in bloom is a material point, and deserving of the greatest attention, as the general effect is much increased or deteriorated thereby. I therefore suggest the policy of placing such flowers at a distance as are striking and showy, contrasting them by neighbours of directly opposite colours, reserving delicate and finely propertied varieties for closer inspection. As a means of preserving flowers in bloom, bees must be carefully excluded: muslin blinds answer well for this purpose, as the light and air by such means can be freely admitted, while the whole insect tribe can be kept out. Cuttings of favourite sorts should be taken as early in autumn as convenient, as they strike more readily, and make finer plants. The general cutting down of the plants should take place in July. They should be allowed to become quite dry, and then cut close, leaving only sufficient eyes to break from. The greenhouse is the best place for them, and here let them have plenty of air till the wounds are healed, then water them, and keep them close to induce them to break freely; this they will quickly do, and when the new shoots have lengthened to about an inch or so, let them again become dry, shake them out of the old soil, and cut the roots totally back, and re-pot them into six-inch pots; plunge them in gentle bottom heat, when they are to be placed under the course of treatment recommended for young plants. There is little or no difficulty in striking cuttings of Pelargoniums, as in most seasons they will strike under hand-glasses in a properly prepared border, at all times in frames with a little bottom heat. They will root in about three weeks, when they should be potted singly into small-sized pots, and when thoroughly rooted, shifted into four-inch pots, at the time when my suggestions for the growth of these plants is supposed to commence. It has been said by a celebrated grower of the Pelargoniums, that "seasons, situations, and soils, exercise their influence, and produce different results, even when the course of treatment is precisely the same." I admit this to be partially correct, but deem general directions not the less valuable, because practice and observation will soon correct any trifling error that may arise from a combination of such causes; serious defects are not to be supposed. The foregoing directions are certain to prevent such an occurrence, if carefully carried out. The following are a few of the best varieties in cultivation, both old and new. Drury's Pearl, Lyne's Forget-me-not, Foster's Orion, Topping's Brilliant, Beck's Rosamond, Foster's Ariel, Hoyle's Sparkler, Cock's Hector, Beck's Gulielma, Centurion, Isabella, Cavalier, Marian, Arabella, Muster, Star, Refulgent, Delicatissima, Foster's Constance, Gipsy, Bride, Paragon, Painted Lady, Minerva, Lamartine, Victory, Mina, Undine, Gaine's Miss Halford, Salamander, Lyra, Meleager, Aspasia, Forth's Negress, Hoyle's Mount Etna, Story's Mont Blanc, Hoyle's Crusader, Belle of the Village. Fancy Pelargoniums are becoming every day greater favourites, and it cannot be disputed that they possess many claims to that distinction; the diversified colours and profusion of bloom ensure them a welcome everywhere; and though I must confess that they are not all of the first order of fine forms, yet the improvement that has been made with this class in a comparatively short space of time warrants the belief that ultimate perfection is anything but impossible, or improbable; consequently, it is only fair to give them their due share of encouragement, seeing they boast some desirable qualities wanting in those varieties usually denominated show-flowers. I have met with some of these fancy Pelargoniums that were extremely odoriferous, and, in addition to their extraordinary profuseness of bloom, of the most varied and brilliant colour; the foliage was luxuriant, and lengthened period of blooming extending far beyond the usual limits assigned to this class of flowers, the shape of some blooms I have noticed being very tolerable, though, as regards size, certainly inferior to the other kinds. What is wanting with them is increased consistency of the petals, greater rotundity of the bloom, and more variety. The last season has produced several very near approaches to this desideratum; the next I am fully persuaded will be still richer in novelties of this description; and speaking from what I positively know to be fact, there are two or three varieties to come out that will almost eclipse those at present in cultivation. The following are a few of the best, and such as cannot fail to give satisfaction to all admirers of this interesting class of flowers. I will endeavour to describe them, as all my readers may not be as well acquainted with the new flowers in this way as with more generally cultivated kinds. Gaine's Gem: upper petals, rosy purple, margined with pearly white; lower petals, same colour, blotched with rosy purple. Gaine's Delight: upper petals, purplish crimson, margined with white; lower petals, same colour, blotched with purple. Gaine's Madame Malibran: a rosy lilac variety, edged with silvery white, and a spot of the same tint on the upper petals. Gaine's Orestes: upper petals, brilliant light crimson, or high rose, with purplish spot; lower petals, purplish crimson, with pretty white centre. Gaine's Madame Alboni: upper petals, shaded crimson; lower petals, rosy lilac. Gaine's Porodii: upper petals, purplish crimson, edged with silvery white, blotched with lilac; lower petals, white, blotched with rich purple. Gaine's Lady Louisa Cornwallis: upper petals, rich puce, edged with rose; lower petals, lilac, with purplish blotch, white centre. Gaine's Elegans: upper petals, beautiful white, blotched with rose; lower petals, white, with purplish spot. Gaine's Nimrod: upper petals, purplish crimson, with distinct crimson spot; lower petals, same colour, mixed with deep purplish rose. Gaine's Priam: upper petals, pure white, with beautiful violet spot; lower petals, perfectly white. Gaine's Queen Superb: upper petals, purplish lilac, edged with pearly white; lower petals, perfectly white. Gaine's Nina: upper petals, lilac, with black spot, margined with rose; lower petals, pearly white, blotched with rose. Gaine's Signora Carolini; upper petals, rich crimson, edged with beautiful lilac; lower petals, white, blotched with rose. Odorata Variegata, a white flower, with oak-leaved foliage, and extremely fragrant; so powerful, that a leaf or two will perfume a room sufficiently to prove agreeable. In addition to which, the remaining novelties will be found to have been successfully exhibited during the season at most of the metropolitan shows,—Anois, Bouquet Toutfait, Bijou, Countess St. Germains, Gipsey, Ibrahim Pacha, Jenny Lind, Jehu Superb, la Belle d'Africa, Mignon, Madame Rosetii, Madame Mulley, Ne Plus Ultra, Picta, Reine des Français, Virgil, Ylolinchi, Yeatmanyanum, and Wintonia. There are several others equal to the foregoing, but nothing superior that I know of. Having done all in my power to render the cultivation of the Pelargonium perfectly intelligible to amateurs, I have only to add, that certain success attends them if they follow the directions I have laid down; at least I am emboldened to state as much, from the fact of many cultivators of this tribe of plants having expressed their perfect satisfaction at the result of similar suggestions, as humbly offered by me for their guidance.

REMARKS ON THE KINDS AND CULTIVATION OF STRAWBERRIES.

By Henry Bailey, Gardener to George Harcourt, Esq., M.P., and the Countess of Waldegrave, Nuneham, Oxford.

The management of the Strawberry for forcing has been ably described by Mr. Fleming in a former number of this Miscellany, and a few hints upon its successful cultivation in the open ground may, perhaps, not prove unacceptable to those who desire to have this agreeable and innocuous fruit in the state of perfection to which the high culture of the present day has brought it.

While the cultivation of the Pine Apple (one of the most noble of our exotic fruits) has become less a consideration among the highest classes of society, and that fruit has become plebeian since the large importations from the West Indies,—while our markets are inundated with foreign Grapes, Peaches, Plums, and Apples, the British gardener need not fear that the "Comte de Paris" will lessen the value of his "British Queen." The flatness and insipidity of Strawberries gathered for some time, the tenderness of the fruit, and difficulty of packing in large quantities, must ever make home-grown fruit of this kind valuable; added to this, its freedom from acetous fermentation, and other unwholesome properties, its facility of production in large and small gardens, make it, perhaps, the most desirable of all fruits, whether for the splendid table of the prince, or the humble one of the poor cottager.

It is not intended, in the course of this paper, to enter into the legendary history of this fruit, or to quote from the arrangement made by the Horticultural Society, at Chiswick, many years ago; the writer, however, would mention this with becoming deference, as the most systematic attempt to classify the varieties of the strawberry which was ever made; but most of the kinds there mentioned have become obsolete, and are succeeded by others with qualities far surpassing their predecessors. Neither is it intended to say anything respecting the history, origin, or ancient culture of it; those who seek for this may consult "Loudon's Encyclopædia," "The Transactions of the Horticultural Society," &c., but simply to take up the subject as it exists in the present day, to enumerate the best kinds for various purposes, and to describe a course of culture which has been crowned with great success in the production of an abundance of fine and well-flavoured fruit.

In treating the subject, it may be well to consider what are the kinds most suitable for the requirements of a large establishment, for the various purposes of the cook, the confectioner, and the dessert; and from these remarks, the cultivator upon a small scale will be able to select kinds suitable to his less comprehensive purpose.

The cooks and confectioners prefer those kinds which are of a brilliant colour, and which have sufficient sharpness of flavour to predominate over the mass of sugar with which they are amalgamated in the processes of preserving. For the purpose of making jam, creams, and for juice, the scarlet strawberries are best; but for preserving whole none are equal to the Elton Pine. The varieties of scarlets are numerous, some of them ripen much earlier than others, and an old kind, called The Duke of Kent's Scarlet, is the earliest; but for these purposes a few days in the ripening of a variety in the open ground (now so many are produced under glass) is less an object than formerly; and, although later, the Grove End stands pre-eminent as a scarlet for colour, size, and productiveness, yielding both quality and quantity. Keen's Seedling is sometimes used for jam, but is of a dark dull colour; it is, however, much improved by the addition of red currant juice. The Elton Pine is also improved by this addition, and its magnificent fruit, preserved whole, have a very prepossessing appearance as a portion of winter dessert.

Of the kinds best adapted for table, the Keen's Seedling is the first to ripen in the open ground upon a south border. This is too well known as a valuable kind to require comment here. Alice Maude is a little later, but not first-rate in flavour; it is, however, useful, and produces, under good management, very large fruit. Hooper's Seedling is a noble Strawberry in appearance, but too acid in flavour. Both these kinds are worth cultivation, from their fine appearance, and as ripening before the incomparable British Queen. Myatt's Eliza is one of the best Strawberries in cultivation; the fruit is not large, but of exquisite flavour; it ripens just before, and continues in bearing for some time with the British Queen. The Hautbois comes in about the middle of the Strawberry season. It is considered the greatest rarity, and held in the highest esteem at the tables of the great, but it is, at the same time, most difficult to get a crop of; and here it may not be uninteresting to say a few words upon this choice fruit.

There are two kinds in general cultivation, the prolific or conical, and the large flat; the latter, as its name implies, attaining the greater size; both, when well ripened, are perhaps equally rich in the musky aroma which is the distinguishing character of the Hautbois. It has been said that there are male and female plants, the latter only producing fruit, but requiring the presence of the male to effect that purpose. It is, however, certain, that the Strawberry is generally hermaphrodite, but frequently *imperfectly* so; and hence, there are always plants more or less sterile. These grow with greater luxuriance than the fruit-bearing ones, and soon, if allowed to do so, run over the entire bed, rendering it completely barren. To prevent this, when the fruit is ripe the bed should be carefully examined, rooting out every unproductive plant, and propagating only from those which yield abundantly of good fruit. This course of proceeding carried out for successive seasons, and the routine of culture properly attended to, the fruit may be depended upon with as much certainty as a crop of "Scarlets."

The first attempts to combine quality with size in Strawberries were mere *abortions*, partaking too much of the coarseness and hollowness of the old Chile kind; such was Wilmot's Superb; but thanks to the perseverance and enterprise of Mr. Myatt, of Deptford, we have now attained that which was so long a desideratum. His British Queen, as it is one of the largest, so is it one of the best varieties which have ever been raised; if it has a fault, it is that in wet sunless seasons it does not ripen quite up to the apex. It is, however, an invaluable kind.

Myatt's Globe is a good bearer and a well-flavoured fruit, ripening about the same time as British Queen; it is well worth cultivation. Eleanor is also good.

The kinds already mentioned have carried us on with a supply of good table fruit over a considerable part of the season. The next in succession, the Elton Pine, is the most valuable of late Strawberries, producing immense crops, and yielding, when grown on a north border, a fine supply both for the table and preserving. To prolong the supply, some of the early-forced kinds, turned out of pots into the open ground, will produce a few fruit in the autumn, and the Alpine kinds will continue to give occasional dishes till their progress is arrested by frost.

There are some few new varieties of Strawberries, which are being sent out for the first time this season. Cuthill's Black Prince has been recommended, but the writer does not know it. Kitley's Goliah is said to excel British Queen, but this has yet to be proved. Myatt's Mammoth is most magnificent in appearance, but quite nauseous as to taste. A few may be tolerated in a large garden for the sake of their splendour and size. The varieties which have now been mentioned comprise all that are really worth growing, and are well deserving of every attention as to culture; it now remains to point out the mode by which the finest fruit may be obtained, and to that end it is purposed to consider,

1st. The philosophy or rationale on which the present mode of growing Strawberries is founded.

2ndly. To point out the advantages resulting from its adoption, as compared with the mode formerly in use.

3rdly. To detail the course of treatment recommended.

This will form the subject of a future paper.

The Philosophy or Rationale upon which the present Mode of cultivating the Strawberry is founded.

In the culture and improvement of those productions of the vegetable and animal kingdoms which yield sustenance, Providence has widely opened a wide field for the exercise of the reason and enterprise of the human race. The wild animals are subdued by kindness and stratagem, and labour usefully in our service, or are made to yield the greatest quantity of warm material for our clothing, or the most nutritious food according to our requirements; and, not only is man permitted to eat bread by the "sweat of his brow," or, in other words, to obtain by hard labour the bare necessaries for his existence: but the choicest fruits and the fairest flowers are attainable by the exercise of patient perseverance. The variety with which nature abounds seems inexhaustible. Our choicest apples are but the progeny of the austere crab, and our now magnificent raspberries and strawberries the improved races, which the skill of man has raised from the small fruited kinds which were originally natives of the wild forests. The original kinds were comparatively worthless; growing in dense, shady woods, within which the beams of solar light were unable to penetrate. To this primæval state succeeded their cultivation in crowded beds, a mode almost as objectionable for its exclusion of light as the tangled thicket, and affording us a useful hint, that we must not always blindly follow nature, but that we must make ourselves acquainted with general principles and assist her operations.

Light then is all important in the culture of the strawberry, and, indeed, of all fruits whatever; it is only when fully exposed to its action that the leaves of plants perform their functions properly—that they perform that most important agency in the economy of creation which they were destined to fulfil, by decomposing the noxious carbonic acid gas which is given off by the animal world in large quantities, appropriating the carbon for the useful products of plants, and giving off the oxygen to combine with the nitrogen, which forms our atmosphere for animal respiration. It may here be remarked that this theory of emanation of oxygen from the leaves of plants was beautifully illustrated the other day by an experiment of Dr. Daubeny's. It is well known that in pure oxygen all ignited substances burn with a peculiar brilliancy. To prove the transpiration of this gas the learned professor (with only the aid of the sickly light of a December sun) collected in a vessel, the gas given off by some leaves of plants, introducing a taper which was slowly burning in the common atmosphere; it instantly emitted a most brilliant light, showing the presence of a larger proportion of oxygen than the common air contained.

There can be then no doubt of the correctness of this theory, and it is for this reason that the finest strawberries are produced by single plants in single rows, say 2 feet 6 inches apart; such plants have fine foliage, the surface of which is fully exposed to the solar light, and by its action the greatest amount of organisable matter is stored up for the production of fruit.

In every large and well managed garden the crop of strawberry plants should not occupy the same plot of ground more than two seasons; this crop should form part of a judicious rotation, and it may be made to do so by annually making a plantation and destroying one. This is necessary, not on account of the old theory of excrementitious emanation from the roots of plants, but rather because as all plants differ in chemical analysis, they each appropriate to themselves certain principles which the soil contains, but which in time become exhausted.

The mode of growing strawberries in wide single rows, independently of the advantage of exposing the foliage more fully to light, possesses the superior advantages which are attendant upon all crops which are in equidistant straight lines; the cultural operations of hoeing, weeding, watering, and gathering the fruit, are all performed with greater facility than when grown in wide heterogeneous beds. Presuming that the necessary drainage of the land has been provided for, the soil should be deeply trenched and highly manured, As soon as the runners are ready, let each be laid into a small pot, as if intended for forcing; when the pot is filled with roots, plant them in rows 2½ feet apart—this system of preparing the plants saves labour and disappointment, less watering is required, and the plants are so fully established that they receive no check, but commence growing at once. Some authorities are doubtful as to the propriety of removing the runners, our practice is to do so, and we question the correctness of the doctrine that advocates their retention.

The foliage should never be mown or cut off, but carefully removed as it becomes dead, and ceases to perform its functions: a little rotten dung may with advantage be most carefully pointed in with a fork (not dug with a spade) in the Autumn months. In keeping the fruit clean we find that nothing is so good as straw, short grass has been recommended, but we deprecate it. In wet summers there cannot be a worse material. Sir Joseph Banks conjectured that the strawberry derived its name from the practice of laying straw under its fruit. In cases of very fine or particular fruit, it is sometimes worth while to tie up the trusses to small sticks to obtain colour and flavour, and it is proper to thin the trusses if extra fine fruit is desired. We believe that if the ground is well prepared and manured, abundance of good soft pond water applied during the swelling of the fruit is in itself sufficient to produce as fine fruit as can be desired; but in light soils and in dry seasons this is a *sine quâ non.* With regard to particular kinds of manure, we believe that good stable manure, where it can be got in sufficient quantity, contains the greatest quantity of available food for plants, and that guano is an excellent substitute for it, but fear there have been many recommendations which are mere nostrums; we would not however discourage farther experiment with artifical manures. We trust that the light of science which has dawned upon the practice of gardening will continue to shine more and more brightly, dispelling the dark mists of ignorance and prejudice; and we doubt not that many valuable discoveries have yet to be made as regards the application of substances, which are best calculated to supply to particular plants their peculiar food.

The Advantages of the present Mode of growing Strawberries as compared with older Practices.

It was not an uncommon practice in bygone times to appropriate certain portions of the soil of a kitchen-garden to the annual cultivation of such crops as were thought most suitable to the soil. Thus, strawberry beds, asparagus beds, and quarters of fruit bushes, as gooseberries, &c., remained stationary till their produce was worthless. The annual planting and destruction of the beds of strawberries is a great advantage as far as the rotation of crops is concerned, and we find it advantageous that the crop of strawberries should be followed by one of late celery, for which purpose the ground can be cleared in good season. In a good garden the soil should seldom be unemployed in producing crops unless for the purpose of ameliorating stiff and stubborn soils by exposure to the atmosphere. A crop of coleworts may be planted between the wide rows of plants in the Autumn, to be drawn out in early Spring before they shade or draw much nourishment from the ground. A crop of peas with us is generally the precursor of strawberries in the year in which the plantation is made, so that the soil is always under crop, kept clean, and by the free admission of sun and air a larger quantity of finer fruit is obtained than was ever practicable under the old system of cultivation,—that of crowded and exhausted beds which were the nurseries of noxious weeds, and productive of small ill-flavoured fruit.

In conclusion then, we advise those who would have fine strawberries to make good preparation by trenching deeply and manuring amply. We recommend extra care to be bestowed in the preparation of the plants as detailed; ample space for the development of the foliage, and the performance of its important functions; the removal of all runners which can be spared; never to remove the foliage till its vitality has ceased; the greatest care in stirring the surface soil with a fork—abundance of pond water on light soils during the swelling of the fruit; and the planting a patch of all the kinds annually. Such is an epitome of a practice which has been in our own case most successful, and such results we believe those who follow our advice may themselves attain.

In the first part of this paper we made some remarks on the properties and uses of various kinds of this useful fruit. With reference to that enumeration, it may be observed, that the object was to give a useful selection from our own practical experience, rather than to give a long list of varieties which are of little value. It is hoped that the hints which have been given may prove useful to the numerous class of amateur readers of this periodical, for whose benefit, rather than that of the practical gardener, they are respectfully offered.

ROOTS OF TREES FILLING UP THE TILES IN DEEP DRAINS.

By Mr. William Tillery, Trentham.

Some of the deep drains in the garden, here, were completely stopped, by the roots of trees getting into the tiles. This was about eight years ago: and the object of the present communication is to make known the plan I then took to prevent them from getting stopped for the future; which, up to this time, has answered perfectly. In all the deepest drains here, there are shafts placed at certain distances, to see how they run; and this no doubt (from the quantity of atmospheric air circulating in them) enticed the roots of trees to go so deep. One drain about 12 feet deep, passed near a large Walnut tree, and when opened, I found that 20 feet of the tiles were completely filled up with matted fibres, so that very little water could ooze through them; another Walnut tree, at least 30 feet from this drain, had likewise reached the tiles. This drain after being cleared and relaid, was covered over the tiles with a three-sided trunk made of thick oak slabs, Kyanised, opposite to every tree where there was any danger of its roots getting in. The slabs were nailed closely together, and made wide enough to leave some space clear all round the tiles, and 2 feet of old lime rubbish mixed with brickbats, was put over the trunk.

Walnuts, Ashes, and Elms, are the trees mostly to be guarded against, when drains must be brought in their vicinity; but some shrubs, such as the Barberry, and Lilac, and so on, will find their way into the tiles at the depth of 4 or 5 feet, as I found out in opening a choked-up drain last year; even a horse-radish root was traced to the depth of 4 feet in the same drain: this shows the danger of making drains near to trees and shrubs, unless some special care is taken to keep the roots out.

GOETHE'S ESSAY ON THE METAMORPHOSIS OF PLANTS.

(*Translated from the German by* Edward Ortgies).

(Continued from Page 349).

VII. *Of the Nectaries.*

51. Quick as the transition of petals into stamens may be in many plants, we still shall have to observe that nature cannot always achieve this at a single step. She very often produces intermediate organs, which in shape and function approach nearer to one part or the other, and though these formations are greatly varied, they still may be collected under one definition, as forming "slow transitions of the petals into stamens."

52. Most of those differently formed organs which Linnæus termed nectaries, may be comprehended under this definition; and we find here again occasion to admire the

great acuteness and penetration of this extraordinary man, who, without being able to give a satisfactory explanation of these organs, relied on a mere presentiment in venturing to give one collective name to all these apparently heterogeneous organs.

53. Several petals show us their affinity with stamens, by bearing, without being visibly altered in their shape, glandular bodies, which exude a honey-like fluid. That this fluid appears to be an indigested, not quite elaborated fecundating fluid, we might feel inclined to think, from the reasons already mentioned; and this supposition will become much more probable by other reasons, which will be found in the following paragraphs.

54. Afterwards, we find the so-called nectaries of a determined and proper character, and in that case they approach in their formation sometimes to petals, sometimes to stamens.

55. We feel induced from the above reasons to count the paracorolla likewise with the nectaries. For, as the formation of the petals is brought about by an expansion, the paracorolla will, like the stamens, be formed by contraction. So we find inside of a perfectly developed corolla, a small and contracted paracorolla in Narcissus, Nerium, Agrostemma, and others.

56. We see in different genera of plants other changes in the petals, which are still more curious and striking. We observe in different flowers, at the base of their petals, a small cavity, filled with honey-like fluid. This cavity often becomes deeper in several plants, and produces on the back of the petals a spur or horn-like elongation, at the same time the whole petal becomes more or less modified. We may observe this in several species and varieties of Aquilegia.

57. We find this organ transformed to the greatest degree in Aconitum and Nigella damascena, but with a little attention we shall be able to recognise its affinity with petals. Specially in Nigella it easily resumes the shape of a petal, and by this transformation of nectaries to petals the flower becomes double. The resemblance of the nectary with the helm-like petal, which covers it in Aconitum, will soon be found out after careful examination.

58. After having explained that nectaries are gradual transitions of petals into stamens, we may now have opportunity to make some observations on irregular flowers. So we might, for example, describe the five external petals of Melianthus as genuine petals, and the five internal ones as a paracorolla, consisting of six nectaries, of which the upper one approaches nearest to the form of petals, and the lower one, already taken to be a nectary, bearing the least resemblance. From the same motives we might take the carina of papilionaceous flowers for a nectary, as, inclosed by the other petals, it forms itself nearest to the shape of stamens, and is very far off the petal, like the formation of the so-called vexillum. In this manner we might easily explain the brush-like bodies attached to the point of the carina in some kinds of Polygala, and might form a clear idea of the destination of these parts.

59. It is scarcely necessary to mention here, that it is not our intention in making these observations, to bring into confusion what has been separated and classified by others, we only wish to better explain the various formations of different organs by these remarks.

VIII. *Some more Observations on Stamens.*

60. That the sexual organs of plants are, like the other parts, produced by spiral vessels, has been raised above all doubts by microscropical observations. We take herefrom an argument for the internal identity of the different organs of plants, which have hitherto appeared under greatly varied forms.

61. Now, if the spiral vessels lie in the centre of bundles of vascular vessels, enclosed by them, we may get a remote idea of their great power of contraction, considering the spiral vessels, which really appear to us as elastic springs, in their highest degree of force, when they will become predominant, and, accordingly, the expansion of the vascular vessels become subordinate.

62. The shortened fascicles of vascular vessels can now no longer spread out, to seek each other again, and, by the action of anastomose, to form a net-work; the cellular vessels, formerly forming the tissue, cannot develope themselves now; all the causes by which

leaves, sepals, and petals, expanded in breadth, fall away here, and a weak and very simple filament is produced.

63. If we now admit that the same vessels, which we before saw elongate, spread out and rejoin, are at present in a condition of the highest contraction; if we see them deliver their now highly-finished fecundating dust (pollen), which supplies, by its activity, what the vessels that contained it have lost in extension; if this pollen, now entirely free, seeks the stigmas, which, by the same action of nature, are growing towards the anthers; if it adheres to them, communicating its influences; we feel not disinclined to call this a spiritual anastomose, and believe it, at least for a moment, to have brought the ideas of vegetation and reproduction nearer together.

64. The fine pollen produced in the anthers, appears to us as a kind of dust; but these grains of pollen are only the vessels, in which a very fine fluid is contained. We quite agree with those who are of opinion that this fluid is absorbed by the stigma, explaining fertilisation in this manner. This becomes the more probable, as some plants have no pollen, but only a mere moist matter.

65. This reminds us of the honey-like exudation of the nectaries, and its probable affinity with the elaborated fluid in the grains of pollen. Perhaps the nectaries are preparatory organs; perhaps their honey-like fluid is absorbed and perfectly digested and prepared by the stamens; an opinion which becomes more convincing as this exudation is no longer observed after fertilisation has taken place.

66. We must not forget here to observe, though briefly, that the stamens, as well as the anthers, are very often united in different ways and degrees, showing the most remarkable instances of the action of anastomose, already several times spoken of, and of the combination of parts, which were quite separated in their origin.

IX. *Formation of the Style.*

67. After having been trying to prove the internal identity of the different organs of plants, developing successively, and so greatly varying in their external formation, it may easily be supposed that it is now my intention to explain the structure of the style and stigma, in the same manner.

68. We firstly consider the style, separated from the fruit (ovary), as we often find it in nature. We may do this so much easier, as it shows itself quite distinct from the ovary under this form.

69. We shall remark here that the style stands on the same point of growth where we find the anthers. For we could observe that anthers are produced by a contraction; now the styles are mostly in the same case; and we find them, if not always of quite equal length with the stamens, only a little shorter or longer. In many cases the style looks like a stamen without an anther, and the affinity of their external formation is greater than in the other organs. As both of them are produced by spiral vessels, we see so much clearer that neither part forms proper organs; and if the close affinity between them becomes evident by this observation, we find that idea—to call fertilisation an anastomose—much more evident and appropriate.

70. We find very often the style composed of several united styles, and the parts of which it consists are hardly discernible, even at their points, where they are not always separated. This combination, the action of which we have already often observed, becomes here more possible than ever; it must even take place, because these tender parts, before their perfect development, lay so very closely together in the centre of the flower-bud, that they may unite themselves to the most intimate degree.

MISCELLANEOUS.

Aquatic Vegetation. That splendid aquatic, called, in compliment to our Queen,

Victoria Regia was discovered by Dr. Schomburgh, on the 1st of January, 1837, on the river Berbice, in British Guiana. The flower is composed of many hundred petals passing in alternate tints from the purest white to rose and pink. When the flower-bud expands it is white, and pink toward the centre; the pink tint gradually diffuses its glow over the entire disc, and on the following day, the whole is entirely suffused with that colour.

The flower is fragrant; the diameter of this goodly blossom is 15 inches, or 3 feet 9 inches in circumference. The leaf is orbiculate, or salver-shaped, with a broad rim of light green above, and a vivid crimson below. The leaf, in one instance, measured 6 feet 5 inches in diameter; and its rim 5 and-a-half inches in depth; the ribs were in prominent relief, about an inch high, and radiated, as if from a common centre; the stem of the flower near the calyx, which is reddish-brown, is an inch thick, and studded with sharp elastic prickles about three-fourths of an inch long. Air-cells abound in the veins, leaf, and flower-stalk, as well as in the petals adjoining the calyx: the seeds are imbedded in a spongy mass in a many-celled receptacle.*

But among all the phenomena of vegetation in aquatic abodes, none, perhaps, presents a more wonderful aspect than the

Valisneria spiralis. This remarkable plant is *diœcious*, and is, so to speak, a divided being. The roots are distinct and independent; and the plants are sometimes separated from each other at considerable distances. At a certain period of the year, the two separate classes of flowers, as by a signal mutually given, perfect their buds.

In the one plant they part entirely from the stem, mount to the surface of the stream, and there suddenly expand; they then float about, apparently at the caprice of the stream and seemingly without the control of design, like snow-flakes; the other plant, however, whose flowers are supported on the summit of spiral stalks, coils, or winds up in corkscrew, these flower-buds from the bottom of the river, where they unfold in the air simultaneously with the other floating flower-cups.

In process of time, its purpose being completed, the flower shuts, and by the contractile spiral fibre, is withdrawn to perfect its seeds in the watery medium.

This curious and truly interesting plant, is found not only in the tanks of India, (and Dr. Schouw told me he discovered what he considered a distinct species of *Valisneria*, in the fosse at Milan), but is an inhabitant of the Rhone, and other rivers that are subject to sudden changes of level, by an influx of the debacle or mountain-torrent, supplied by the melting of the glacier.

The *Valisneria spiralis* is therefore enabled by this beneficent provision of spiral stems, to adjust its flower to variable surfaces. The design is truly wonderful; but "it is of a piece with the rest." I have found that when the latter plant is isolated, it possesses the property of evolving infant plants which floated around their parent, as in the case of the *Pontederia crassipes.—Economy of Vegetation.*

Vital Principle in Plants. What the "vital principle" is, or where it is to be found, I pretend not to know; like its Almighty author, "No man hath seen it at any time," yet it is the *punctum saliens* which throbs through the system of vegetation, and the source and spring of all its functions and productions; a dense and mysterious veil, however, conceals it from the hierophant. The philosophy of man has never withdrawn this inscrutable *Ens* from the adytum where it remains enshrined. I am aware that an interdict like this, is not palatable in these days, when the wit of our philosophy soars so high above *mystery*, and would deny what it cannot solve. This, however, is not the philosophy which I have been taught; neither does it contain the elements of that of Bacon; it will not do in this case, to cut the Gordian knot we cannot untie; it makes the matter worse. It seems to my mind as demonstrable as any problem in Euclid, that the "principle of life," is one *sui generis*, superadded to organisation; some there are who ascribe all the phenomena of life to mere *organisation*, or a peculiar arrangement of the ultimate atoms or *molecules*, as the French call them; and some have ascribed an "innate vitality" to these atoms; others may whistle to the tune of this dance of dust, and quadrille or waltz of molecules, but I must stand aloof from their eccentricities.

To-day we see the plant a beautiful living thing, arrayed in a vesture of green, and blossoming in beauty, unfurling its ensigns to the sun, and all its functions moving in harmony, and obedient to the "principle of life:" to-morrow that plant has suffered an eclipse. There is now a sad reverse; it is a leafless and a lifeless thing. Its flowers and foliage are scattered to the four winds of heaven; its "silver cord is loosed"—the principle of life has fled, and the fountain of beauty is dried up. The most exquisitely finished and most delicate specimen of mechanism, with its varied wheels, pivots, and pinions, superadded to its spring and balance, still wants its compensation curb to regulate its chronometry, and the artist's hand must wind it up; and can we doubt that the Master-key that wound up the machinery of vegetable creation hangs at the girdle of infinite intelligence?

The "principle of life" is neither *heat* nor *electricity*, nor any other agent with which we are acquainted; it is far more subtile and recondite. These are merely, if the term be permitted, the *tentacula* of its operations; it can sleep for thousands of years in Egyptian tombs and mummy-cases, or remain for ages many hundred fathoms deep in the rocky recesses of the globe, or at unfathomed depths in seas and lakes. It can run the gauntlet of fire in temperatures that would scorch or scald; it can live in the crater of the volcano, or in cerements of ice, or a mantle of snow; its identity remains unimpaired through lapse of time or change of circumstance.

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* This description of *Victoria Regia*, is of course made in reference to its native habitat.

These positions, startling though they may seem to be, can be substantiated by indubitable proof; some curious cases have already been glanced at, and a few more may suffice. I took nine seeds out of a *roasted* Apple, and every one of them grew; malted Barley has grown, and peas and cress, &c., after being roasted and boiled, were capable of germination; while the seeds of Elder-berries, after being boiled, grew very well. Jessie, in his "Gleanings," mentions seeds that have grown, brought up from a depth of 360 feet in boring for a well; and seeds found in very ancient tombs have readily sprung up. Some seeds were discovered in an ancient British tumulus; they were sown, Raspberries sprung up, and fruit has been collected from the plants. A bulb was taken from the withered hand of an Egyptian mummy, and it has since grown; various seeds discovered in these mementos of mortality have grown. Some grains of the *Triticum durum*, found in the body of a mummy, grew with me: as well as seeds of Indian Corn, found in one of the graves of the Incas of Peru. A plant of *Phormium tenax*, in the *Jardin des Plantes*, which was apparently reduced to charcoal by a conflagration, has risen, like a vegetable phœnix, from its ashes. An Elder-tree, near Matlock, was cut down, and subsequently remained under a stack, where it was consumed, apparently by fire; in its after-adventures, it became a corner-post, when it budded, and is now a thriving tree.—*Ibid.*

PLANTS FIGURED AND DESCRIBED IN THE LEADING BOTANICAL PERIODICALS FOR NOVEMBER.

Aërides suavissimum. *Sweetest-scented Air-plant.* A native of the Straits of Malacca, whence it was introduced by Messrs. Loddiges. In general appearance it is similar to *Aë. odoratum;* in fragrance, more balsamic and delicious. The sepals and petals are white, with a lilac tip; and the lip is of a pale nankeen colour, with a lilac streak along the centre of the middle lobe.—*Hort. Jour.*, 4264.

Angræcum Pescatoreanum. *M. Pescatoré's Angrœcum.* A native of the Island of Bourbon. It was introduced to the Horticultural Gardens through M. Pescatoré, an eminent banker of Paris, and the possessor of the finest collection of orchids in France. The flowers are small, and produced in short, dense, cylindrical spikes, and are white.—*Hort. Jour.*, vol. iv., 263.

Begonia cinnabarina. *Cinnabar-flowered Elephant's Ear.* For the particulars of this fine species, see *Mag. of Gard. and Bot.*, page 225.

Brachysema aphyllum. *Leafless Brachysema.* This interesting plant is not yet in actual cultivation, but is figured by Sir W. Hooker, from dried specimens, aided by a coloured drawing made from the recent plant at the Swan River Settlement, in the interior of which colony it is a native, and whence seeds as well as dried specimens, have been sent by Mr. Drummond. The flowers are at first orange, sprinkled with red, afterwards deep red, or blood-coloured. It may be expected to thrive if grown in rough peat soil, mixed with a portion of sharp sand, the pot being well drained, so as to prevent the chance of the soil becoming stagnant, care being taken during the hot weather in summer, that it is placed in a shady situation.—*Bot. Mag.*, 4481.

Cleisostoma lanatum. *Woolly Cleisostoma.* A native of the continent of India, introduced by George Wailes, Esq., of Newcastle-on-Tyne, with whom it flowered in July, 1849. It has distichous, broad, blunt leaves, and a dense, branched woody raceme with small flowers, like those of some Bolbophylls, of a pale yellow colour with purple stripes. It possesses no beauty.—*Hort. Jour.*, iv., 264.

Clerodendron Bethuneanum. *Capt. Bethune's Clerodendron.* Whoever had the gratification of seeing the superb panicle of flowers of this *Clerodendron* in the stove of Messrs. Lucombe, Pince, and Co., of Exeter Nursery, may form some idea of the treasures yet to be expected from the researches of Mr. Lowe, junr., in Borneo. "Four species of this genus," Mr. Lowe says, "adorn the banks of the Sarawak river, two of them, which are fragrant, bear white flowers; another is scarlet; another crimson." This last is the handsomest, and has been named after Captain Bethune, R.N., who brought it, and several other fine plants, from Borneo. It requires the stove and similar treatment to the other kinds.—*Bot. Mag.*, 4485.

Cyrtopodium cardiochilum.—This beautiful plant exists in gardens as a variety of either *C. Andersonii*, or *punctatum*, from both of which it is perfectly distinct. The flowers are large and yellow like the first, and they are slightly speckled with crimson like the second; but there the resemblance ends.—*Hort. Jour.*, iv., 266.

Espeletia argentea. *Silvery Espeletia.* Seeds of this plant were sent in 1845, from the Paramo of Siego, New Grenada, by Mr. Purdie, who says it is there called "Frailejon." The whole plant has a peculiar and somewhat terebinthian odour, and yields, like the genus *Silphium*, a copious gum-resin, used in the preparation of ink, and for other purposes. It is really a beautiful and remarkable plant, and a stately one when in flower, attaining then the height of 5 or 6 feet. The flowers are yellow; and the plant is nearly hardy, but will require sheltering in a greenhouse or pit, to prevent its being injured by wet.—*Bot. Mag.*, 4480.

Ixora laxiflora. *Lax-flowered Ixora.* A native of Sierra Leone, and recently introduced to our stoves by Mr. Whitfield. It is a delicate and very sweet-scented plant; and, although its pale flowers are not showy, it is well worthy of general cultivation. It requires to be grown in a warm hothouse, in a mixture of light loam and leaf mould, and may be grown readily from cuttings.—*Bot. Mag.*, 4482.

Tabernæmontana longiflora. *Long-flowered Tabernœmontana.* A new and valuable acquisition to our stoves, recently imported by Messrs. Lucombe, Pince, and Co., Exeter Nursery, from Sierra Leone, through Mr. Whitfield. It forms a very handsome shrub, with the aspect of a Citrus; has white or pale cream-coloured flowers, diffusing a delicious aromatic fragrance, resembling that of Cloves. It requires a warm stove, and thrives in a mixture of loam and peat-soil, if placed so as to have the benefit of bottom-heat, and watered and syringed freely during the summer.—*Bot. Mag.*, 4484.

Tetrzaygia Fadyeni. *Dr. M'Fadyen's Tetrazygia.* A handsome Melastomaceous plant, native of Jamaica, whence it was communicated to Sir W. Hooker, by Dr. M'Fadyen. As a species, it is abundantly distinct from any hitherto described. The flowers are purple, and borne in terminal many-flowered cymes.—*Jour. Bot.*, 379.

Warrea discolor. *Two-coloured Warrea.* A native of Costa Rica, (purchased by R. S. Holford, Esq., at a sale of plants collected by Mr. Warcsiewitz); it is a very distinct species, apparently one-flowered; the habit is that of *Huntleya violacea.* The sepals are straw-coloured, and the petals the same at the base, but dull purple at the upper end. The lip is of a deep, dull, velvety purple; the column is yellow and shaggy in front. It is a remarkable species, the single flowers of which resemble a Lycaste; but their pollen apparatus and lip appendage are exactly those of Warrea.—*Hort. Jour.*, iv., 265.

Warrea Wailesiana.—*Mr Wailes's Warrea.* A native of Brazil, in the neighbourhood of the river Parahyba. This species was received from the late Mr. Gardner, by George Wailes, Esq., of Newcastle-on-Tyne. It has a one-flowered scape, and is not a species of much beauty. The flowers, which smell of Sweet Pea, are cream-coloured, and about as large as those of *Warrea cyanea. Hort. Jour.*, iv., 264.

CALENDAR OF OPERATIONS FOR JANUARY.

FRUIT AND VEGETABLE DEPARTMENT.

Glass.

Cherry Trees in pots and tubs, for forcing, and those stationary and trained in houses devoted to this purpose, should be started very gently any time this month, and gradually increase the average supply of heat as the light increases by the advancing season.

Fig Trees in pots and tubs, which have been well exposed to the cold of winter, should now be top dressed, or shifted into the forcing-houses, and as growth advances increase the supply of water, with an occasional change of thin liquid manure; and with judicious stopping, &c., good early crops will, without fail, be insured.

Peach Trees in houses must be forced very gently; those in pots may, also, be generally brought in, and, until they come into bloom, syringe freely, and keep the flues moist. Give, also, a good supply of air when the weather will permit, and by careful disbudding, and judicious stopping of the young shoots, when sufficiently long, good crops will be ripened.

Vines in pots, which were started early in December, will, before this month closes, be in bloom, give a free circulation of air, and keep the internal air humid; in this stage no water can be allowed to be syringed on the plants, as by this much of the pollen will be displaced and rendered abortive, so that an unequal setting of the bunches would be the consequence; let the heat also be moderate. Vines on the rafters deal very gently with, so as not to hurry them with too much excitement, whilst there is so little light. This apparent delay can be fully remedied when the season is further advanced.

Pineries. The same directions as those given last month will apply to this, as no extra excitement can or ought to be given until winter begins to draw towards a close.

Strawberries in pots may be introduced every fortnight; place them in a damp atmosphere near the glass, where the heat is very moderate, and often syringe.

Vegetables, as Asparagus, Rhubarb, and various other kinds, should now be regularly forced.

Open Air.

Pruning and Nailing. Attend to at every convenient season. Peaches and Nectarines, however, would be better delayed until the beginning of February, or, at least, until the buds have advanced a little, as pruning them too early sometimes proves injurious if the weather should afterwards be very severe.

Prepare dung for forcing, trench ground, and forward every kind of winter work as much as possible.

FLOWER DEPARTMENT.

Glass.

Conservatory and **Greenhouse.** If matters have been managed well, these departments will now be gay. The various kinds of Camellia, Epacris, Corræa, Acacia, Cineraria, Chinese Primrose, and many others will now be making a good display.

Orchid-house and **Stove.** Rest is what now must be attended to; the plants will require but little water, and the temperature should be low, yet the atmosphere must be kept humid. Re-pot any that are beginning to grow.

Forcing Pit. Introduce Roses, American plants, and other things for forcing into flower.

Open Air.

Progress with alterations when the weather will allow, and make every preparation for spring.

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